DOCUMENT RESUME

ED 322 030 SO 020 995

AUTHOR	Chorlton, Tom; And Others
TITLE	AAG Annual Meeting: Programs and Abstracts. Proceedings of the Association of American Geographers Conference (Toronto, Ontario, Canada, April 19-22, 1990).
INSTITUTION	Association of American Geographers, Washington, D.C.
PUB DATE	90
NOTE	382p.
PUB TYPE	Collected Works - Conference Proceedings (021) -- Speeches/Conference Papers (150)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Geography; Higher Education; Social Science Research; Social Scientists; Social Studies

ABSTRACT

This document includes six sections. Section 1 lists special events and services. Section 2 outlines sessions and meetings. Section 3 includes a list of field trips, workshops, and special events. Section 4 lists various indexes: an index of sponsoring organizations, a subject index, and a participants index. Numbers assigned to each item in an index refer to session numbers. Section 5 lists exhibitors and advertisers. The majority of the document is found in section 6: abstracts of papers and posters, organized in alphabetical order by the first or presenting author. Advertisements for books, publishers, and various services of interest to geographers appear throughout the document. (DB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

AAG

ANNUAL MEETING

PROGRAM AND ABSTRACTS
APRIL 19-22, 1990
TORONTO

ED322030

SO 020 995

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
S. J.
NATOLI
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

BEST COPY AVAILABLE

AAG Officers

President
Saul B. Cohen
Governor's School and Business Alliance

Vice President
Susan Hanson
Clark University

Secretary
Richard H. Skaggs
University of Minnesota, Minneapolis

Treasurer
Stephen S. Birdsall
University of North Carolina, Chapel Hill

Past President
David Ward
University of Wisconsin, Madison

Executive Director
Ronald F. Abler
Association of American Geographers

1990 Local Arrangements Committee

Marie Truelove, Chair, Ryerson Polytechnical Institute
Neil Field, University of Toronto, ex officio
Gerald Walker, York University, ex officio
Ronald Abler, AAG, ex officio
Sally Meyers, AAG, ex officio
Carl Amrhein, University of Toronto
Philip Coppack, Ryerson Polytechnical Institute
Michael Doucet, Ryerson Polytechnical Institute
Ken Jones, Ryerson Polytechnical Institute
Lucia Lo, York University
Virginia Maclaren, University of Toronto
Bryan Massam, York University
Aidan McQuillan, University of Toronto
Robert Murdie, York University
Edward Relph, University of Toronto
Nicholas Siller, Ryerson Polytechnical Institute
John Warkentin, York University
Joseph Whitney, University of Toronto

1990 Field Trip Committee

Gerald Walker, Chair, York University
Marie Truelove, Ryerson Polytechnical Institute, ex officio
Ronald Abler, AAG, ex officio
Sally Meyers, AAG, ex officio
Michael Bunce, University of Toronto
Beth Carlson, Ryerson Polytechnical Institute
Thomas McIlwraith, University of Toronto

1990 Program Committee

Neil Field, Chair, University of Toronto
Marie Truelove, Ryerson Polytechnical Institute, ex officio
Ronald Abler, AAG, ex officio
Sally Meyers, AAG, ex officio
Carl Amrhein, University of Toronto
Alan Baker, University of Toronto
Rorke Bryan, University of Toronto
Beth Carlson, Ryerson Polytechnical Institute
Tony Davis, University of Toronto
Robert Dilley, Lakehead University
Frank Duerden, Ryerson Polytechnical Institute
Bryn Greer-Wootten, York University
Lino Grima, University of Toronto
Ken Jones, Ryerson Polytechnical Institute
Anthony Lea, Ryerson Polytechnical Institute
Virginia Maclaren, University of Toronto
John Radford, York University
Roger Roberge, University of Ottawa
Wayne Rouse, McMaster University
Michael Troughton, University of Western Ontario
Joseph Whitney, University of Toronto

Cover Design:
Melanie Orwig, Cartographic Services
University of Maryland, Baltimore County
Illustrations:
From *The Toronto Guide: The City, Metro, The Region*
by Ted Relph, University of Toronto

Printed on recycled paper

AAG

ANNUAL MEETING

PROGRAM AND ABSTRACTS
APRIL 19-22, 1990
TORONTO

Compiled by

Tom Chorlton
Amy Crane
Vonda Witman Dashner
Kevin Klug
Sally Meyers
Linda Snyder

1904

©Association of American Geographers
1710 Sixteenth Street, NW
Washington DC 20009-3198

1990 AAG Annual Meeting Activity Planning Sheet

Thursday, April 19	Friday, April 20	Saturday, April 21	Sunday, April 22
7:30 am - 11:30 am	7:40 am - 9:20 am	7:40 am - 9:20 am	7:40 am - 9:20 am
	9:30 am - 10:45 am President's Plenary Session I	9:30 am - 10:50 am President's Plenary Session II	9:35 am - 11:15 am
11:30 am - 2:00 pm Department Chairs Luncheon	11:00 am - 12:40 pm	11:05 am - 12:45 pm	11:30 am - 1:10 pm
1:00 pm - 3:00 pm	12:55 pm - 2:35 pm	1:00 pm - 3:00 pm SG Chairs Luncheon	1:25 pm - 3:05 pm
3:00 pm - 4:40 pm	2:50 pm - 4:30 pm	1:45 pm - 3:25 pm	
5:00 pm - 6:40 pm	4:45 pm - 6:25 pm	3:40 pm - 5:20 pm	
8:00 pm - 9:15 pm Opening Session	6:30 pm - 10:30 pm	5:30 pm - 6:30 pm AAG Annual Business and Special Awards Meeting	
9:15 pm - 10:30 pm Opening Reception		7:00 pm - 8:00 pm Pre-Banquet Reception	
		8:00 pm - 10:30 pm Annual Meeting Banquet	

TABLE OF CONTENTS

Sections

I. Special Events and Services
II. Sessions and Meetings
III. Field Trips, Workshops, Special Events
IV. Indexes
V. Exhibitors and Advertisers
VI. Abstracts

INSTRUCTIONS TO CHAIRS

Please consider carefully the instructions and points that follow:

1. For paper sessions, a specific time has been scheduled for each paper to begin. This enables all attendees at the meetings to be present at all (non-conflicting) presentations they wish to hear. This is particularly important this year, when as many as 35 concurrent sessions may be in progress. **Please adhere to the times printed in the final program.** There will be some unavoidable and unfortunate breaks in the program caused by withdrawals, no-shows, and other unexpected incidents. You may wish to use such a break for free and open discussion of ideas, or simply to call a recess.

   Please do not move later papers into the void caused by the unexpected omission. This is unfair both to participants you reschedule on your own, and to those who expect to appear at a particular time to hear a presentation.

2. Notice of the withdrawal of papers has been included on an addendum sheet enclosed with your registration materials. **Please consult this addendum to insure that you are familiar with any cancellations in your session.** Then, you may plan ahead to use the free time for the benefit of the session.

3. As always, some participants will tend to run over their allotted time in their presentation. The printed, scheduled time should aid you in persuading them to keep within their limits.

4. The Local Arrangements Committee will endeavor to have a student aide available at each paper session. If audiovisual equipment or required assistance is not available in the room, report immediately to the Local Arrangements Office (Conference A). The student aide will ask for your comments and suggestions immediately after the session.

5. Please familiarize yourself with the exact location of the hotel house phone that is nearest the meeting room. Should a medical or other emergency occur during the session, the phone should be the quickest source of qualified assistance.

TEXTS AND REFERENCES ON DISPLAY FROM JOHN WILEY & SONS, INC., BOOTHS 111 & 210

THE WORLD IN PERSPECTIVE

A Directory of World Map Projections

Frank Canters and Hugo Decleir

This introduction to the theory and practice of map projections includes a directory of 68 computerized projection formulae, demonstrating the deformation characteristics and relative merits of a wide variety of projection techniques.

0471-92147-5 1989 181 pages $69.95

THE REMOTE SENSING OF OIL SLICKS

A.E. Lodge, Editor

Discusses the monitoring and regulatory use of existing and future remote sensing systems for oil detection in inshore and offshore environments.

0471-92043-6 1989 165 pages $113.00

WORLD FACTS AND FIGURES

Third Edition

Victor Showers

This exceptional resource provides students with the latest comparative information on a multitude of geography-related topics. Includes tabular data for 220 countries on 19 subjects, including area, population, birth and death rates, GNP, exports and imports, and rates of literacy.

0471-85775-0 1989 720 pages $74.95

WORLDMARK ENCYCLOPEDIA OF THE NATIONS

Seventh Edition

Moshe Y. Sachs, Worldmark Press, Ltd.,
Editor and Publisher

"An exceptionally useful encyclopedia ... carefully edited and well-conceived ... recommended for all general reference collections."

LIBRARY JOURNAL, on previous editions

A detailed and authoritative reference, providing definitive coverage of the geographic, historical, political, social, and economic status of 176 countries and over 80 dependencies.

0471-62406-3 1988 Five Volumes 1,800 pages $285.00

WORLDMARK ENCYCLOPEDIA OF THE STATES

Second Edition

Moshe Y. Sachs, Worldmark Press, Ltd.,
Editor and Publisher

"The most comprehensive reference work on the fifty states of the union ... this encyclopedia stands alone in its field."

JOHN BARKHAM REVIEWS

An updated, comprehensive portrait of each of the 50 states, plus the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and other dependencies.

0471-83213-8 1986 690 pages $105.00

Longman Scientific & Technical Publications

POLITICAL GEOGRAPHY

World-Economy, Nation-State and Locality
Second Edition

Peter J. Taylor

From a review of the First Edition:

"Simply stated Taylor has written the best textbook yet to come out of the revitalized political geography."

PROGRESS IN HUMAN GEOGRAPHY

Second Edition Now Available

0470-21473-2 1989 308 pages $29.95 (Paper)

TOURIST DEVELOPMENT

Second Edition

Douglas Pearce

From a review of the First Edition:

" ... essential reading for anyone involved in the study of tourism."

TOURISM MANAGEMENT

0470-21339-6 1989 341 pages $29.95 (Paper)

DEVELOPMENT THEORY AND THE THREE WORLDS

Björn Hettne

Available in February 1990, this text provides a history of development theory, encompassing the Third World as well as the Western Industrialist and Socialist worlds.

0470-21519-4 1990 350 pages $31.95 (Paper)

WESTERN EUROPE

Geographical Perspectives, Second Edition

Hugh Clout, Mark Blacksell, Russell King and David Pinder

From reviews of the First Edition:

" ... Western Europe can be confidently recommended as a stimulating background text for areally based courses."

GEOGRAPHY

0470-21193-8 1989 224 pages $29.95 (Paper)

CARTOGRAPHIC DESIGN AND PRODUCTION

Second Edition

John S. Keates

Exploring the science and art of cartography, the new second edition covers traditional processes of map design and production, and all aspects of mapmaking.

0470-21071-0 1989 261 pages $39.95(Paper)

Longman Scientific & Technical Publications are available in the U.S. from John Wiley & Sons, Inc., and in Canada from Copp, Clark, Pitman. Prices listed are for U.S. only and may be higher in Canada.

See these titles, and many more, at the Wiley Booths 111 & 210 AAG Convention, 1990

Prices subject to change.

WILEY

To Order Write to: WILEY INTERSCIENCE
Attn: Sheila Aronson Dept. 0-0087
John Wiley & Sons, Inc.
605 Third Avenue
New York, NY 10158
OR CALL TOLL FREE: 1 800 526-5368

0-0087

I. SPECIAL EVENTS AND SERVICES

TUESDAY, APRIL 17

9:00 a.m. to 12:00 noon
AAG Executive Committee. Conference F.

12:00 noon to 5:00 p.m.
NCGE Executive Committee. Conference A.

1:00 p.m. to 10:00 p.m.
AAG Council. Conference F.

6:30 p.m. to 10:30 p.m.
NCGE Executive Board. Conference A.

WEDNESDAY, APRIL 18

7:30 a.m. to 4:00 p.m.
AAG Council. Conference F.

8:00 a.m. to 6:00 p.m.
Registration. Concourse.

NCGE Executive Board. Conference B.

THURSDAY, APRIL 19

8:00 a.m. to 6:00 p.m.
Registration. Concourse.

9:00 a.m. to 6:00 p.m.
Speaker Ready Room. Vide Checkroom.

11:30 a.m. to 2:00 p.m.
Department Chairs Luncheon. Civic Ballroom.

1:00 p.m. to 5:00 p.m.
Local Arrangements/Press Office. VIP Room.

2:00 p.m. to 7:00 p.m.
Convention Placement Service. Promenade.

7:30 p.m. to 10:00 p.m.
Registration. Concourse.

8:00 p.m. to 9:15 p.m.
Opening Session. Grand Ballroom East.
Speaker: Bernard Ostry, Chairman, TV Ontario

9:15 p.m. to 10:30 p.m.
Opening Reception. Grand Ballroom Lobby. Hors d'oeuvres compliments of Ryerson Polytechnical Institute, University of Toronto, and York University.

FRIDAY, APRIL 20

7:00 a.m. to 6:00 p.m.
Registration. Concourse.

Speaker Ready Room. Vide Checkroom.

7:15 a.m. to 5:00 p.m.
Local Arrangements/Press Office. Conference A.

9:00 a.m. to 5:00 p.m.
Paper Sales. Sheraton Hall.

Convention Placement Service. Promenade.

Exhibits. Sheraton Hall.

9:30 a.m. to 10:45 a.m.
Presidential Plenary Session I: Sharing the North American Continent. Grand Ballroom East.
Speakers: F. Kenneth Hare, University of Toronto and Trent University; John E. Hall, Consul General of the United States of America in Toronto

SATURDAY, APRIL 21

7:00 a.m. to 2:00 p.m.
Registration. Concourse.

7:00 a.m. to 6:00 p.m.
Speaker Ready Room. Vide Checkroom.

7:15 a.m. to 5:00 p.m.
Local Arrangements/Press Office. Conference A.

9:00 a.m. to 5:00 p.m.
Paper Sales. Sheraton Hall.

Convention Placement Service. Promenade.

Exhibits. Sheraton Hall.

9:30 a.m. to 10:50 a.m.
Presidential Plenary Session II: Sharing the Global Village. Grand Ballroom East.
Organizer: Gilbert F. White, University of Colorado-Boulder
Speakers: Wilfred Bach, University of Münster; Kathleen Braden, Seattle Pacific University; Samuel Goward, University of Maryland at College Park; Vladimir M. Kotlyakov, Soviet Academy of Sciences; B.L. Turner II, Clark University; Anne V. Whyte, International Development Research Center, Ottawa; Thomas J. Wilbanks, Oak Ridge National Laboratory.

1:00 p.m. to 3:00 p.m.
Specialty Group Chairs Luncheon. Redwoods Restaurant.

5:30 p.m. to 6:30 p.m.
AAG Annual Awards and Business Meeting. Dominion Ballroom.

7:00 p.m. to 8:00 p.m.
Pre-Banquet Reception. Grand Ballroom Lobby.

8:00 p.m. to 10:30 p.m.
AAG Annual Banquet. Grand Ballroom East.
Speaker: David Ward, University of Wisconsin, Madison

SUNDAY, APRIL 22

7:00 a.m. to 2:00 p.m.
Speaker Ready Room. Vide Checkroom.

7:15 a.m. to 1:00 p.m.
Local Arrangements/Press Office. Conference A.

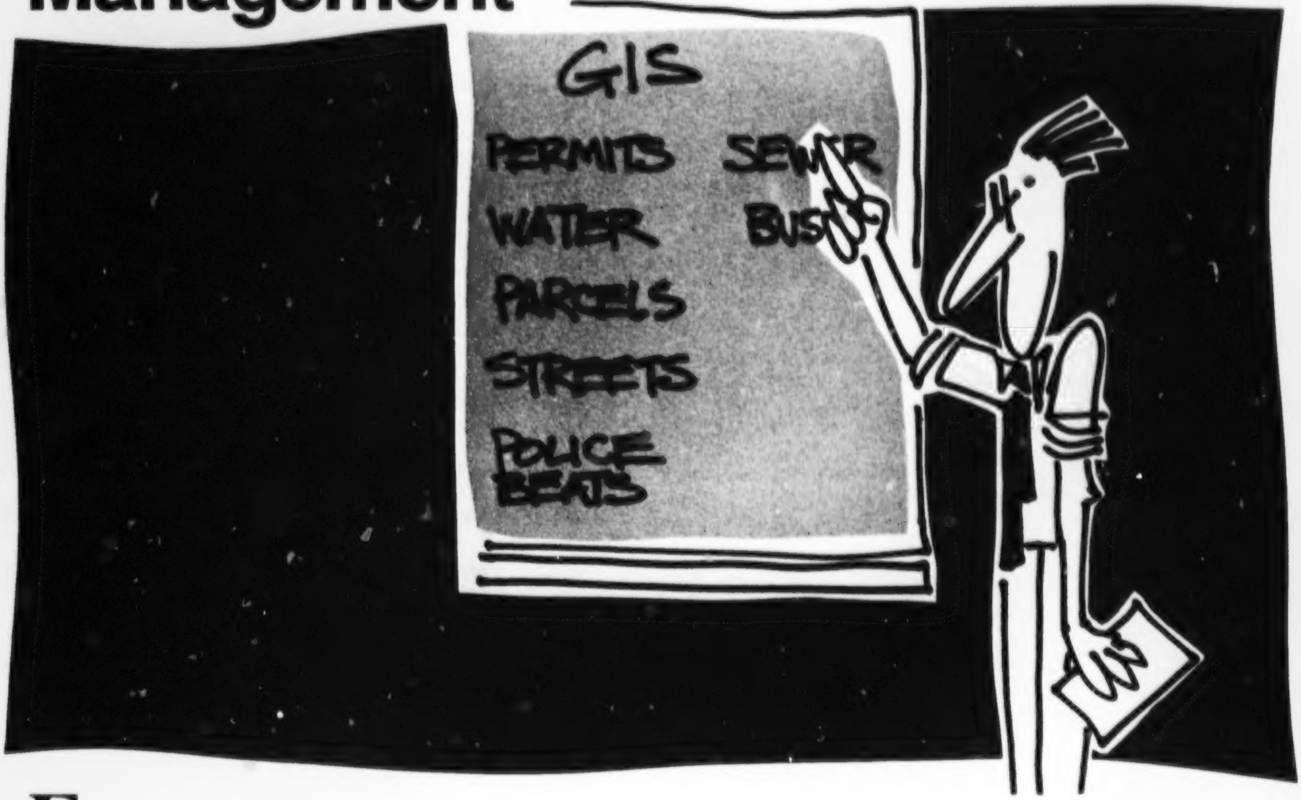
8:00 a.m. to 11:00 a.m.
Convention Placement Service. Promenade.

9:00 a.m. to 12:00 noon
Paper Sales. Sheraton Hall.

Exhibits. Sheraton Hall.

1:25 p.m. to 3:05 p.m.
Current and Future Local Arrangements and Program Committees: Meeting. Conference F.

ARC/INFO: The Total Geographic Information System for Municipal Management



ESRI provides the tools you need to efficiently manage any form of geographic information. Our ARC/INFO Geographic Information System (GIS) software lets you efficiently automate, analyze and display spatial data for a wide variety of applications. This information is available at your fingertips for quick queries of the data base or for producing publication-quality maps and tabular reports. ARC/INFO runs on several minicomputer, workstation, mainframe and microcomputer systems, and supports a variety of graphic devices for input and display.

Because ARC/INFO is a toolbox of functions, it is useful for nearly any application which involves spatial data. For example, cities and counties use ARC/INFO to map parcel and street information, and relate it to building permit data, sewer and water lines, bus routes, police beats, and other related geographic data. Biologists use these same tools to analyze wildlife by overlapping maps of vegetation, water sources, topography, and land use. Regardless of the application, the resulting maps and reports present a clear picture of the information to field researchers, decision-makers, and others who require up-to-date and accurate information in their jobs.

ESRI also provides consulting services relating to data base design, user needs assessments, data analysis and modeling, data automation and custom applications programming. To date, several hundred projects have been completed for clients all over the world.

For more information on ESRI contact:
ESRI Marketing Department, 380 New York St.
Redlands, California 92373,
or call (714) 793-2853.

II. SESSIONS AND MEETINGS

SUNDAY, APRIL 15, 1:00 pm
to
WEDNESDAY, APRIL 18, 5:00 pm

1. Field Trip 1: Northern Ontario.
Organizer: **Fred Helleiner**, Trent University

TUESDAY, APRIL 17

8:00 am to 5:00 pm

2. Field Trip 2: Agriculture in Southwestern Ontario.
Organizer: **Michael J. Troughton**, University of Western Ontario

9:00 am to 12:00 noon

3. AAG Executive Committee. Conference F.

12:00 noon to 5:00 pm

4. NCGE Executive Committee. Conference A.

1:00 pm to 10:00 pm

5. AAG Council. Conference F.
Chair: **Saul B. Cohen**, Governor's School and Business Alliance

6:30 pm to 10:30 pm

6. NCGE Executive Board. Conference A.

WEDNESDAY, APRIL 18

7:30 am to 4:00 pm

1001. AAG Council. Conference F.
Chair: **Saul B. Cohen**, Governor's School and Business Alliance

8:00 am to 5:00 pm

1002. Workshop 1: Macintosh Mapping for Professional Publication. York University.
Organizer: **Judy M. Olson**, Michigan State University
William A. Bowen, California State University-Northridge;
Dennis Fitzsimons, Southwest Texas State University;
Frank Gossette, California State University, Long Beach;
Judy M. Olson, Michigan State University;
Eugene J. Turner, California State University, Northridge;
David DiBiase, Pennsylvania State University.

8:00 am to 6:00 pm

1003. Registration. Concourse.

1004. NCGE Executive Board. Conference B.

8:00 am to 8:00 pm

1005. Workshop 2: Digital Processing of Remotely Sensed Data (Day 1). Norfolk.
Organizer: **Tina Cary**, Earth Observation Satellite Company
Shamim Naim, University of Wisconsin-Waukesha;
Jeffrey A. Olsenholler, University of Maryland;
David P. Lusch, Michigan State University.

8:30 am to 5:00 pm

1006. Workshop 3: Mapping and More Using TIGER/Line Files. Ryerson Polytechnical Institute.
Organizer: **Ann Goulette**, U.S. Bureau of the Census
Frederick R. Broome, U.S. Bureau of the Census;
Amy Bishton, U.S. Bureau of the Census;
Ramala Basu, U.S. Bureau of the Census;
Donald F. Cooke, Geographic Data Technology, Inc.;
Said Khosrowshahi, GIS Corporation.

8:30 am to 6:30 pm

1007. Field Trip 4: The Urban-Rural Fringe.
Organizer: **Robert J. P. Gale**, University of Toronto

9:00 am to 5:00 pm

1008. Workshop 6: Intergovernmental Relations: Within and Across Governmental Hierarchies. Essex.
Organizer: **Rex Honey**, University of Iowa
I. Max Barlow, Concordia University;
John Mercer, University of Victoria;
C. Murray Austin, University of Northern Iowa.

9:30 am to 5:00 pm

1009. Field Trip 3: New Religious Patterns.
Organizer: **Allan Gleason**, (Retired)

THURSDAY, APRIL 19

7:30 am to 5:00 pm

2001. Field Trip 5: Erosional Processes and Lake Bluff Retreat.
Organizers: **Rorke B. Bryan**, University of Toronto, **Brian Greenwood**, University of Toronto

8:00 am to 12:00 noon

2002. Workshop 4: Elements of Map Critique. Huron.
Organizer: **Andrew J. Wahll**, National Geographic Society
Philip J. Gersmehl, University of Minnesota;
Sona Karentz Andrews, University of Wisconsin-Milwaukee;
Brian Harley, University of Wisconsin, Milwaukee;
Paul Pugliese, TIME Magazine;
Mark Warhus, University of Wisconsin.

8:00 am to 1:30 pm

2003. Workshop 2: Digital Processing of Remotely Sensed Data (Day 2). Norfolk.
Organizer: **Tina Cary**, Earth Observation Satellite Company
Shamim Naim, University of Wisconsin-Waukesha;
Jeffrey A. Olsenholler, University of Maryland;
David P. Lusch, Michigan State University.

8:00 am to 3:30 pm

2004. US National Committee of the IGU. Kenora.
Chair: **Melvin G. Marcus**, Arizona State University

8:00 am to 6:00 pm

2005. Registration. Concourse.

Thursday, April 19

8:30 am to 11:30 am

2006. Field Trip 9A: Ontario Centre for Remote Sensing.
Organizer: **Nigel Roulet**, York University

8:30 am to 6:00 pm

2008. Field Trip 7: The Vernacular Landscape.
Organizer: **Thomas McIlwraith**, University of Toronto-Erindale Campus

2009. Field Trip 8: The Niagara Escarpment: Biogeography and Geomorphology.
Organizers: **Anthony M. Davis**, University of Toronto, **Joe Desloges**, University of Toronto

9:00 am to 11:00 am

2010. Urban Geography Specialty Group: Executive Committee. Spin Drift (4th floor).
Chair: **Susan Hanson**, Clark University

9:00 am to 12:00 noon

2011. Industrial Geography Specialty Group: Firms, Regions, and Labor: Industrial Restructuring Under North American Freer Trade. Grand Ballroom West.
Organizer: **Meric S. Gertler**, University of Toronto
Chair: **Meric S. Gertler**, University of Toronto
9:00 John Holmes, Queen's University, The Continental Integration of the North American Automobile Industry;
9:20 Roger Hayter, Simon Fraser University, **Eric Grass**, Simon Fraser University, The Canadian/US Free Trade Agreement: Implications for the Canadian Lumber Industry;
9:40 James W. Harrington, University at Buffalo, Determinants of International Involvement by Commercial Banks;
10:00 James E. McConnell, University at Buffalo, **Alan MacPherson**, University at Buffalo, Canadian-Owned Subsidiaries in Western New York: An Analysis of Corporate Strategy, Industry Structure, and Regional Economic Impact;
10:20 Daniel Drache, York University, The Future of Collective Bargaining in the Post-Free Trade Environment.

9:00 am to 1:00 pm

2012. Field Trip 10: Toronto's Financial District.
Organizer: **Gunter Gad**, University of Toronto-Erindale Campus

9:00 am to 4:30 pm

2013. Workshop 5: Using Third World Films to Teach Regional Geographies. Cinema II.
Organizer: **Gerald M. Macdonald**, Villanova University

9:00 am to 6:00 pm

2014. Speaker Ready Room. Vide Checkroom, Lower Concourse.

11:30 am to 2:00 pm

2015. Department Chairs Luncheon. Civic Ballroom.
Chair: **Susan Hanson**, Clark University

1:00 pm to 2:40 pm

2016. Cartography Specialty Group: Toward a Rule Base for Map Generalization II. Windsor West.
Organizers: **Barbara P. Buttenfield**, State University of New York-Buffalo, **Robert B. McMaster**, Syracuse University
Chair: **Barbara P. Buttenfield**, State University of New York-Buffalo
1:00 Robert B. McMaster, Syracuse University, Integrating Existing Rule Bases Within Conceptual Frameworks of Numerical Generalization;
1:20 Timothy Nyerges, University of Washington, Suitable Representation Schemes for Geographic Information Abstraction;
1:40 Marc P. Armstrong, University of Iowa, Knowledge Classification and Organization for Cartographic Generalization;
2:00 Robert Weibel, University of Zurich, Amplified Intelligence and Knowledge Base Systems for Map Generalization;
2:20 Gail Langran, Intergraph Corporation, Desegregating the Components of Map Finishing.

1:00 pm to 3:00 pm

2017. AAG Committee on Affirmative Action and Minority Status: Business Meeting. Carlton.
Chair: **DeWitt Davis Jr.**, University of the District of Columbia

1:00 pm to 4:00 pm

2018. Field Trip 11: Queen's Park: The Ontario Legislature.
Organizer: **Peter Adams**, Trent University

1:00 pm to 5:00 pm

2019. Local Arrangements/Press Office. VIP Room.

1:30 pm to 4:30 pm

2020. Field Trip 9B: Ontario Centre for Remote Sensing.
Organizer: **Nigel Roulet**, York University

1:30 pm to 5:00 pm

2021. Field Trip 12: Toronto's Changing Waterfront.
Organizers: **Roy Merrens**, York University; **Glen Norcliffe**, York University

2:00 pm to 3:00 pm

2022. Regional Development and Planning Specialty Group: Business Meeting. Simcoe.
Organizer: **John E. Benhart**, Shippensburg University
Chair: **John E. Benhart**, Shippensburg University

2:00 pm to 5:00 pm

2023. Industrial Geography Specialty Group: Towards 1992: Industrial Restructuring and the Integration of the European Community. Grand Ballroom West.
Organizers: **Erica Schoenberger**, The Johns Hopkins University, **Peter Dicken**, University of Manchester
Chair: **Erica Schoenberger**, The Johns Hopkins University
2:00 Peter Dicken, University of Manchester, Europe 1992 and Strategic Change in the International Automobile Industry;
2:20 Marc de Smidt, University of Utrecht, International Investments in the European Economic Community;
2:40 Jeremy Howells, University of Newcastle Upon Tyne, Pharmaceuticals and Europe 1992: The Dynamics of Industrial Change;
3:00 Nigel Thrift, University of Bristol, **Andrew Leyshon**, University of Bristol, An Embarrassment of Riches or a Rich Embarrassment? Financial Services and 1992;

3:20 Huib Ernste, ETH-Zurich, Restructuring of Swiss Industry in the Face of European Integration.

2:00 pm to 6:00 pm

2024. Field Trip 13: Inner City and Suburban Office Nodes.
Organizer: **Gunter Gad**, University of Toronto-Erindale Campus

2:00 pm to 7:00 pm

2025. Convention Placement Service. Promenade, Lower Concourse.

3:00 pm to 4:40 pm

2026. Asian Specialty Group (Southeast Asia Division): Forestry Issues in Southeast Asia. Dufferin.
Organizers: **David M. Kummer**, Boston University, **James A. Hafner**, University of Massachusetts, **Thomas R. Leinbach**, University of Kentucky
Chair: **David M. Kummer**, Boston University
3:00 James A. Hafner, University of Massachusetts, Farming the Forest: Managing People and Trees in Thailand's Reserved Forests;
3:20 Robert Walker, Florida State University, Deforestation Processes in Indonesia;
3:40 David M. Kummer, Boston University, A Statistical Analysis of Forest Cover in the Post-War Philippines;
4:00 Martin W. Lewis, George Washington University, Deforestation in the Cordillera of Northern Luzon, Philippines.
Discussant: **Michael Moss**, University of Guelph.

2027. Biogeography Specialty Group: Dynamics of Coniferous Forests. Windsor East.
Organizer: **Thomas T. Veblen**, University of Colorado, Boulder
Chair: **Thomas T. Veblen**, University of Colorado, Boulder
3:00 Alan H. Taylor, University of Maryland, Baltimore Co, Disturbance and Persistence of Sitka Spruce (Picea sitchensis) in Coastal Forests of the Pacific Northwest;
3:20 William L. Baker, University of Kansas, Livestock Grazing Following Fire Switches Tree Dominance in a Subalpine Forest;
3:40 Laura E. Conkey, Dartmouth College, **MaryBeth Keifer**, University of Arizona, **Charles V. Cogbill**, Dynamics of Old-Growth Red Spruce Across Northern New England: Reconstruction from Tree Rings and Stand Analysis;
4:00 Keith S. Hadley, University of Colorado, Stand Response to Repeated Insect Disturbance in the Montane Forests of Rocky Mountain National Park;
4:20 Thomas T. Veblen, University of Colorado, Boulder, **Keith S. Hadley**, University of Colorado, **Marion S. Reid**, University of Colorado (INSTAAR), **Alan J. Rebertus**, University of Colorado, Stand Response to Spruce Beetle Outbreak in Colorado Subalpine Forests.

2028. Topics in Regional Geography. Peel.
Chair: **Vincent Berdoulay**, University of Ottawa
3:00 William H. Warren, University of Hawaii, The Korean Imprint on the Japanese Urban Landscape;
3:20 Gary Hovinen, Millersville University, New Town Planning in Greater Seoul and Taipei: A Comparative Assessment;
3:40 John P. Clements, Virginia Polytechnic Institute & State University, Japan and the Soviet Union: The Northern Territories Dispute;
4:00 William D. Walters Jr., Illinois State University, The Geography of the European Dreadnaught Race;
4:20 Patrick H. McHaffie, University of Kentucky, Land Tenure in Southeastern Kentucky: Ownership as Control.

2029. Third World Urbanization. Huron.
Chair: **Ernst Griffin**, San Diego State University
3:00 Rickie Sanders, Temple University, Rethinking the Significance of Urban Divergence;
3:20 Syed Abu Hasnath, Boston University, Technology Choice, Material Use, & Prospect for Employment in the Building Construction Sector of India:An Analytical Perspective & Some Policy Issues;
3:40 Jashinta D'Costa, Michigan State University, Urban Rank-Size Relationships in Bangladesh;
4:00 Tulasi R. Joshi, Fairmont State College, A Commentary on the Urban Explosion of Kathmandu, Nepal;
4:20 Brian J. Godfrey, Vassar College, Modernizing the Brazilian City: Urban Morphology and Social Space.

2030. Natural Resource Planning and Management. Conf. C
Chair: **Jerry A. Hall**, Wilfrid Laurier University
3:00 O. Orland Maxfield, University of Arkansas, The Geographer's Responsibility in the Conservation of Natural Resources;
3:20 Barbara Morehouse, University of Arizona, The Case of the Vanishing River: Reading the Landscape of the Santa Cruz River, Tucson, Arizona;
3:40 Brian P. Freidhoff, US Military Academy Corps of Cadets, The Missouri River: The Mississippi's Life Blood;
4:00 Christopher Lant, Southern Illinois University-Carbondale, **JoBeth Mullens**, Oregon State University, Lake and River Quality (Not Water Quality) in Recreation Management;
4:20 Robert S. Bristow, Westfield State College, **M. Patrick Curry**, Southern Illinois University, Planning for Scenic Parkways: Institutional Barriers to Development.

2031. Recreation and Resource Analysis. Conference D.
Chair: **Paul F. Wilkinson**, York University
3:00 Steven C. Bourassa, Memphis State University, A Genetic Paradigm for Landscape Aesthetics;
3:20 Robert E. Pfister, California State Polytechnic University-Pomona, A Cross-Cultural Perspective of Recreational Use on the Urban National Forest and the American Land Ethic;
3:40 Jane Ehemann, Shippensburg University, Developing Recreation and Tourism Opportunities in Humberside, England;
4:00 Thomas P. Grimes, Ball State University, The Yacht As Second Home.

2032. Historical Environments. Conference E.
Chair: **Robert E. Ford**, Brigham Young University
3:00 David S. Hardin, University of Maryland, College Park, Laws of Nature: Environmental Legislation in Colonial Virginia, 1619-1776;
3:20 Craig Colten, Illinois State Museum, Illinois River Pollution Control, 1900-1970: A Critique of Environmental History;
3:40 Walter A. Schroeder, University of Missouri, Environment and Settlement in the Historic Ste. Genevieve District (Missouri);
4:00 Arnold R. Alanen, University of Wisconsin-Madison, Cultural and Historic Vernacular Landscapes in the American National Park Service System;
4:20 Susan Enscore, University of Illinois at Urbana-Champaign, Visitors' Perceptions of Authenticity at Outdoor History Museums.

THURSDAY, APRIL 19

2033. Quantitative Methods. Conference F.

Chair: **Lee DeCola**, US Geological Survey

3:00 **Panagiotis Lolonis**, University of Iowa, **Marc P. Armstrong**, University of Iowa, Controlling Service Area Boundaries in Locational Decisionmaking;

3:20 **E. L. Tettey-Flo**, Kent State University, **Milton E. Harvey**, Kent State University, A Dynamic Location-Allocation Approach to Solving the Problem of Emergency Service Supply to Drought-Stricken Areas;

3:40 **J. Lynne Friedmeyer**, Indiana University, Commodity Flows and Spatial Structure;

4:00 **William C. Arlinghaus**, Lawrence Tech University, **Sandra L. Arlinghaus**, Institute of Mathematical Geography, **Frank Harary**, New Mexico State, Sum Graphs in Geography.

2034. Geographical Analysis Editorial Board. Oxford.

Chair: **Michael F. Goodchild**, University of California-SB

2035. Latin America: Population and Politics. Conference G.

Chair: **Vernon Domingo**, Bridgewater State College

3:00 **Alfonso Gonzalez**, University of Calgary, Latin America: Regional Changes in Population;

3:20 **Jacquelyn Chase**, University of California, Los Angeles, Conceptualizing Population Surplus: The Case of Regional Planning in Northeastern Brazil;

3:40 **W. George Lovell**, Queen's University, Maya Survival in Ixil Country, Guatemala;

4:00 **John Brohman**, Simon Fraser University, Revolution and Social Movements: The Sandinista Approach;

4:20 **David Wall**, University of Iowa, The Role of Foreign Aid in the Nicaraguan Economic Transition.

2036. Cartography Specialty Group: Toward a Rule Base for Map Generalization I. Windsor West.

Organizers: **Barbara P. Buttenfield**, State University of New York-Buffalo, **Robert B. McMaster**, Syracuse University

Chair: **Robert B. McMaster**, Syracuse University

3:00 **K. Stuart Shea**, The Analytic Sciences Corporation, Design Considerations for an Artificially Intelligent Numerical Generalization System;

3:15 **M. Kate Beard**, University of Maine, Constraint-Based Transformations in Map Generalization;

3:30 **William A. Mackaness**, University of Otago, Application and Evaluation of Map Generalization Techniques;

3:45 **Barbara P. Buttenfield**, State University of New York-Buffalo, Rules for Automating Feature Distinctions;

4:00 **Jean-Claude Muller**, Int'l. Inst. for Aerospace Survey & Earth Sciences, **Diane Richardson**, Int'l. Inst. for Aerospace Survey & Earth Sciences, User-Oriented Rule Base Generalization for Base Map Production;

4:15 **Bradford Nickerson**, University of New Brunswick, Knowledge Engineering for Cartographic Generalization: A Case Study.

2037. Environmental Issues in an Urban Context. Grand Ballroom East.

Chair: **Robert J. P. Gale**, University of Toronto

3:00 **Jerry E. Green**, Miami University, Landslide Awareness in an Urban Environment: Cincinnati, Ohio;

3:20 **Stephen M. Hackney**, California State University–Chico, Artificial Wetlands: Environment as Fantasy in Urban Development;

3:40 **William D. Romey**, St. Lawrence University, The Politics of Site Selection and Placement of Environmental Sculpture;

4:00 **Karen Frances Falconer**, University of Kentucky, Perception of Campus Landscapes and Fear of Sexual Assault: Effects on Female Undergraduate Travel Behavior at Univ of North Carolina at Chapel Hill;

4:20 **Frederick P. Stutz**, San Diego State University, Social Networks and Spatial Behavior of Downtown Poor Vis-A-Vis Environmental Change.

2038. Theorizing the Spatiality of Social Life. Conference B.

Organizer: **John Paul Jones III**, University of Kentucky

Chair: **John Paul Jones III**, University of Kentucky

Ted Schatzki, University of Kentucky;

Derek Gregory, University of British Columbia;

John Pickles, West Virginia University;

Edward W. Soja, University of California-Los Angeles.

2039. Symbols and Landscape. York.

Chair: **Arthur Krim**, Salve Regina College

3:00 **Dale R. Lott**, Jersey City State College, Hispanic Images of Jersey City;

3:20 **Linda Mulligan**, Ohio State University, Santa Fe: A Landscape of Style and Postmodern Transformation;

3:40 **Randi Horner**, East Carolina University, Symbols in a Changing Landscape: Meaning in a Portrayed Barbadian Village;

4:00 **Judith Kenny**, Syracuse University, A Nineteenth Century Indian Hill Station as Symbol of the Raj;

4:20 **Theano Terkenli Koop**, University of Minnesota, The Idea of Community as Home in the Aegean.

2040. General Social - Economic. Kent.

Chair: **James Eflin**, University of South Florida

3:00 **Lynn A. Staeheli**, University of Colorado at Boulder, **David C. Hodge**, University of Washington, Social Cleavages and Geographic Patterns of Urban Electoral Behavior;

3:20 **John G. Hehr**, University of Arkansas, **Charles R. Britton**, University of Arkansas, **Richard Ford**, University of Arkansas, The Financial Impact of Retirees on Retirement Destination Counties of the Western United States;

3:40 **Woodrow W. Nichols Jr.**, North Carolina Central University, **Donald R. Deskins Jr.**, University of Michigan, Interaction Patterns of Black Doctorates Within Geography;

4:00 **Yehuda Gradus**, Concordia University/Ben-Gurion University, The Role of Universities in Peripheral Regions: The Case of Ben-Gurion University in the Negev;

4:20 **Aharon Kellerman**, University of Haifa, International Telecommunications: Sharing the Global Village?

2041. Geographic Modeling. Grand Ballroom Centre.

Chair: **Sandra L. Arlinghaus**, Institute of Mathematical Geography

3:00 **Keith Clarke**, Hunter College, **Zong-Guo Xia**, Hunter College-CUNY, On the Comparability and Stability of Fractal Measurements from Topography;

3:20 **C. S. Balachandran**, Kent State University, **M. Svendsen**, International Food Policy Research Institute, **R. Meinzen-Dick**, International Food Policy Research Institute, Developing an Expert System to Classify Irrigation Systems;

3:40 **Ze-ming Cheng**, Hunter College, **Victor Goldsmith**, Hunter College, Application of Fuzzy Sets Theory in the Analysis of Pollutants for the New York Bight;

4:00 **Yuhu Che**, Boston University, Fuzzy Relation and Geographical Division Model;

4:20 **Thomas L. Bell**, University of Tennessee, **Richard L. Church**, University of California, Santa Barbara, Relaxing Mathematical Packing Requirements in Hierarchical Central Place Systems.

2042. Climate: Atmospheric Circulation and Precipitation. Civic Ballroom.

Chair: **Steve Ladochy**, California State University, Los Angeles

3:00 Therese Spies, Rutgers University, **David A. Robinson**, Rutgers University, **Peiji Li**, Lanzhou Institute of Glaciology and Geocryology, **Meisheng Cao**, Lanzhou Institute of Glaciology and Geocryology, **George Kukla**, Lamont-Doherty Geological Observatory, Snow Cover in Western China;
3:20 P. Blaise Bright, University of Florida, **Peter Waylen**, University of Florida, Annual Flood Characteristics in Argentina and ENSO Events;
3:40 Michael C. McGlade, Arizona State University, A Modified Sea Breeze: The Case of the Columbia Gorge;
4:00 B. Hewitson, Penn State University, **Robert Crane**, Pennsylvania State University, Validity of General Circulation Model Simulation of Synoptic Scale Circulation;
4:20 Michael E. Ritter, University of Wisconsin-Stevens Point, Wet Acid Deposition at Two Mountain Sites in the Colorado Front Range.

3:00 pm to 5:00 pm

2043. Phoenix Group: Business Meeting. Norfolk.
Chair: **Sallie A. Marston**, University of Arizona

3:00 pm to 6:00 pm

2044. Gamma Theta Upsilon Executive Committee. RFA Suite.
Chair: **Ralph C. Scott Jr.**, Towson State University

3:15 pm to 4:40 pm

2045. AAG Committee on the Status of Women in Geography: Business Meeting. Carlton.
Chair: **Margaret FitzSimmons**, University of California - Los Angeles

3:15 pm to 5:00 pm

2046. Regional Development and Planning Specialty Group: Walking Field Trip of Toronto. Simcoe.
Organizer: **John E. Benhart**, Shippensburg University

5:00 pm to 6:40 pm

2047. Mathematical Models and Quantitative Methods Specialty Group: Advances in Spatial Modeling and Analysis. Conference F.
Organizer: **A. Stewart Fotheringham**, State University of New York at Buffalo
Chair: **Jean-Claude Thill**, University of Georgia
5:00 Arthur Getis, University of Illinois, A New Statistic for the Identification of Spatial Autocorrelation;
5:20 Graham Clarke, University of Leeds, Urban and Regional Modelling in Practice;
5:40 Paul Askew, University of Wales, Access to General Practitioner Services: Quantity vs. Quality.

2048. The Bioregional Concept and Its Applications. Conference B.
Organizer: **W. Donald McTaggart**, Arizona State University
Chair: **Charles S. Sargent**, Arizona State University
5:00 Dick G. Winchell, Eastern Washington University, Counterdevelopment Strategies for Bioregional Development: Native American Communities in Transition;
5:20 W. Donald McTaggart, Arizona State University, The Bioregional Concept and its Application to the Study of Bali, Indonesia.

2049. CLAG: The Conference of Latin Americanist Geographers After Twenty Years. Conference G.
Organizer: **Tom L. Martinson**, Auburn University
Chair: **Tom L. Martinson**, Auburn University
Barry Lentnek, State University of New York at Buffalo;
Gary S. Elbow, Texas Tech University;
A. Richard Longwell, Western Illinois University.

2050. Education - Themes. Windsor East.
Chair: **Miriam K. Lo**, Mankato State University
5:00 Michael Libbee, Central Michigan University, Defining Geography for Teachers: Using the Five Themes to Answer Four Questions;
5:20 Fred A. Lampe, Southern Illinois University, Activities Illustrating the Movement Theme;
5:40 Darrell A. Norris, S. U. N. Y. Geneseo, Fostering Geographic Literacy Without Sterile Place-Learning: Some Examples;
6:00 Sarah W. Bednarz, Texas A&M University, **Robert S. Bednarz**, Texas A&M University, Teaching Place Location: Lessons Learned and Relearned;
6:20 Michael DeVivo, Oregon Institute of Technology, The Pacific Rim: A Regional Geography.

2051. Socio-Economic Change and Problems. Huron.
Chair: **Brian P. Holly**, Kent State University
5:00 Jeremy D. Browning, University of Illinois at Urbana-Champaign, Realism and Urban Resource Allocation Studies;
5:20 Norah F. Henry, State University of New York at Binghamton, Rural Day Care: Needs Assessment for Economic Development;
5:40 Robert Sechrist, Indiana University of Pennsylvania, Tracking Socio-Economic Change in Rural Pennsylvania Through the Mail;
6:00 Nancey Green Leigh, University of Wisconsin-Milwaukee, The Changing Earnings Distributions of US Regions;
6:20 Randall W. Jackson, Ohio State University, **Philip Israilevich**, Federal Reserve Bank of Chicago, Spatial Variation in Production: A Preliminary Analysis of Establishment Data.

2052. Climate Specialty Group: Business Meeting. Civic Ballroom.
Chair: **Anthony J. Brazel**, Arizona State University

2053. Contemporary Agriculture and Rural Land Use Specialty Group: Business Meeting. Conference C.
Chair: **M. Duane Nellis**, Kansas State University

2054. GIS Specialty Group: Business Meeting. Grand Ballroom Centre.
Chair: **Michael F. Goodchild**, University of California-SB

2055. Hazards Specialty Group: Business Meeting. Dominion South.
Chair: **James K. Mitchell**, Rutgers University

2056. Industrial Geography Specialty Group: Business Meeting. Grand Ballroom West.
Chair: **Lay James Gibson**, University of Arizona

2057. Native American Specialty Group: Business Meeting. York.
Chair: **Stephen C. Jett**, University of California, Davis

2058. Recreation, Tourism, and Sport Specialty Group: Business Meeting. Dominion North.
Chair: **Richard W. Butler**, University of Western Ontario

2059. Urban Specialty Group: Business Meeting. Grand Ballroom East.
Chair: **Susan Hanson**, Clark University

2060. IGU Commission on Geography and Public Administration: Informational Meeting. Kenora.
Chair: **C. Murray Austin**, University of Northern Iowa

2061. AAG Committee on International Research and Scholarly Exchange: Meeting. Carlton.
Chair: **William H. Berentsen**, University of Connecticut

2062. IGU Commission on the World Political Map. Windsor West.
Chair: **David B. Knight**, Carleton University

2063. Political: Stressed Populations. Kent.
Chair: **Lubomyr Y. Luciuk**, Queen's University
5:00 **Hussein A. Amery**, McMaster University, Emigration, Remittances, and the Economic Consequences on Two Lebanese Villages;
5:20 **Russel L. Gerlach**, Southwest Missouri State University, The Landscape of Politics in Belfast, Northern Ireland;
5:40 **Niall Charles Majury**, University of British Columbia, "The Tight Gag of Place and Times": The Significance of Place and Territory in the Negotiation of Identity in Northern Ireland;
6:00 **Brian R. Gullette**, University of Kentucky, The State, NGO's amd Refugee Assistance: The Case of Dade County, Florida;
6:20 **Arnon Soffer**, University of Haifa, Terrorist Activities and the Landscape.

2064. Environmental Hazards in Bangladesh. Dufferin.
Organizer: **Chowdhury E. Haque**, Ryerson Polytechnical Institute
Chair: **Belayet H. Khan**, Eastern Illinois University
5:00 **Ziarat Hossain**, Syracuse University, Rural-Urban Dualism Among Urban Squatters: A Case of Serajganj Town in Bangladesh;
5:20 **Chowdhury E. Haque**, Ryerson Polytechnical Institute, **Atiar Rahman**, Bangladesh Institute of Development Studies, Environmental Hazards in Bangladesh: Causes, Consequences, and Adjustments to 1988 Flood;
5:40 **Belayet H. Khan**, Eastern Illinois University, Damage Assessment of the 1988 Flood in Bangladesh.

5:00 pm to 6:40 pm

2065. Cultural Geography and Geographic Perspectives on Women Specialty Groups: Nature, Culture and the Feminist Critique of Science. Simcoe.
Organizer: **Mona Domosh**, San Diego State University
Chair: **Mona Domosh**, San Diego State University
Michael Curry, University of California at Los Angeles;
Mona Domosh, San Diego State University;
Margaret FitzSimmons, University of California - Los Angeles;
Joni Seager, Massachusetts Institute of Technology.

7:30 pm to 10:00 pm

2066. Registration. Concourse.

8:00 pm to 9:15 pm

2067. Opening Session. Grand Ballroom East.
Chair: **Bryan H. Massam**, York University
Speaker: **Bernard Ostry**, Chairman, TV Ontario, Sharing the Air.

9:15 pm to 10:30 pm

2068. Opening Reception. Grand Ballroom Lobby.

FRIDAY, APRIL 20

7:00 am to 6:00 pm

3001. Registration. Concourse.

3002. Speaker Ready Room. Vide Checkroom (Lower Concourse).

7:15 am to 5:00 pm

3003. Local Arrangements/Press Office. Conference A.

7:40 am to 9:20 am

3004. GIS Specialty Group: Theoretical and Pragmatic Issues. Cinema II.
Organizer: **Stephen C. Guptill**, U.S. Geological Survey
Chair: **Stephen C. Guptill**, U.S. Geological Survey
7:40 **Stephen C. Guptill**, U.S. Geological Survey, Benchmarking Geographic Information Systems;
8:00 **Nigel Waters**, University of Calgary, GIS or GKS: Philosophical and Practical Considerations;
8:20 **George F. Hepner**, Florida State University, **Niles Ritter**, Jet Propulsion Laboratory, Artificial Neural Network Processing of Spatial Reasoning Tasks;
8:40 **Andrew U. Frank**, NCGIA/University of Maine, Conceptual Modeling for Geographic Databases;
9:00 **Nancy J. Obermeyer**, Natl Ctr for Geographic Information and Analysis, Institutions Sharing Geographic Information: Prospects and Strategies.

3005. 1990 Nystrom Award Session I. Peel.
Chair: **George P. Malanson**, University of Iowa
7:40 **Lucia Lo**, York University, Spatial Structure, Consumer Preferences and Spatial Interaction;
8:00 **David Angel**, Clark University, Production, Labor Markets, and Location: The US Semiconductor Industry;
8:20 **C. Cindy Fan**, University of California, Los Angeles, The Dynamics of Growth and Manufacturing in the Old Industrial Core: A Case Study of Ohio;
8:40 **Kim V. L. England**, Miami University-Ohio, The Suburbanization of Clerical Work and the Spatial Entrapment of Women;
9:00 **Cutler J. Cleveland**, Boston University, Physical and Economic Aspects of Resource Scarcity: Diminishing Returns in the US Oil Supply Process, 1936-1987.

3006. Urban Geography Specialty Group: Docklands and Notting Hill: Two Londons. Grand Ballroom West, Section X.
Organizer: **Neil Smith**, Rutgers University
Chair: **Liz Bondi**, Edinburgh University
7:40 **Adrian Smith**, University of Kentucky, The New 'City in the East': The State and Gentrification in London's Docklands;
8:00 **Darrel Crilley**, Queen Mary College, The Advertiser and the Architect: Remaking the Image of the London Docklands;
8:20 **John Western**, Syracuse University, The Notting Hill Carnival: Some Barbadian Londoners' Views;
8:40 **Andrew Church**, Birkbeck College, London University, Waterfront Regeneration in the United Kingdom: The Examples of London and Liverpool;
9:00 **Rachel Woodward**, Queen Mary College, Responses to the Redevelopment of an East London District: Arguments Over the Function and Purpose of the Inner City by Resident Communities.

3007. Biogeography Specialty Group: Paleoecological Biogeography: Studying the Past to Serve the Future. Kenora.

Organizer: **Glen MacDonald**, McMaster University
Chair: **Glen MacDonald**, McMaster University
7:40 **J. C. Ritchie**, University of Toronto-Scarborough College, Trends in Paleoecology and the Role of Biogeography;
8:00 **Kam-biu Liu**, Louisiana State University, Large-Scale Ecological Applications of Paleoecology;
8:20 **Patrick J. Bartlein**, University of Oregon, Paleoecological Contributions to Climatological Research;
8:40 **B. H. Luckman**, University of Western Ontario, Problems in Paleoenvironmental Reconstruction Using Tree-Ring Series;
9:00 **Kevin J. Edwards**, University of Birmingham, Off-Site Cultural Palynology in Scotland.

3008. Historical Geography Specialty Group: Alternative Data Sources in the Study of Nineteenth-Century North American Migration. Conference F.
Organizers: **James W. Darlington**, Brandon University, **Gregory S. Rose**, The Ohio State University at Marion
Chair: **David P. Davenport**, Kennesaw State College
7:40 **David P. Davenport**, Kennesaw State College;
7:50 **Randy Widdis**, University of Regina, Sharing the North American Continent: Sources, Methods and Approaches to the Study of Intracontinental Migration: Late 19th and Early 20th Centuries;
8:10 **James W. Darlington**, Brandon University, Tracking America's Learned Elite: College Alumni Catalogues as a Source of 19th Century Migration Information;
8:30 **Gregory S. Rose**, The Ohio State Univesity at Marion, Land Office Records as a Data Source for United States Migration Research.
Discussants: **Peter R. Knights**, York University, **Douglas K. Meyer**, Eastern Illinois University.

3009. Africa: Rural and Development Issues. York.
Chair: **Baher A. Ghosheh**, Edinboro University
7:40 **Thomas J. Bassett**, University of Illinois, Urbana-Champaign, Land Tenure Reform: The Panacea to Africa's Agrarian Ills?
8:00 **Felix Ayikwei Ammah-Tagoe**, Boston University, Food Crises in Africa: Implications for Rural Development;
8:20 **David A. Iyegha**, Alabama State University, Government Policies and Agricultural Development in Nigeria;
8:40 **Mark O. Johnson**, Clark University, Regional Environmental Change and Class Structure in Technological Change and the Development of Capitalist Relations of Production in the Sudan;
9:00 **Christine M. Drennon**, University of Wisconsin-Madison, The Effects of Labor Migrations and Land Tenure in Rural Uganda.

3010. Cartography: Historical/Cultural. Kent.
Chair: **Daniel G. Cole**, Smithsonian Institution
7:40 **David Woo**, University of California, Santa Barbara, Graphic Abstractions in Traditional Chinese Map Design;
8:00 **Robert G. Amey**, University of Florida, **Ralph Brauer**, Institute for Research on Science & Culture, Uses of Desktop Publishing Applications in Historical Cartography: 20th Century Technology and a 12th Century Map;
8:20 **Muharem Cerabregu**, University of Prishtina-Yugoslavia, Scientific Benefits from a Collection of Early Maps of Kosova Province;
8:40 **Judith A. Tyner**, California State University-Long Beach, Cartography in Silk and Wool;
9:00 **James R. Akerman**, The Newberry Library/Pennsylvania State University, Mapping Unit Definition and Regional Concepts in Early Modern Topographic Atlases.

3011. The City: Perspectives on Image and Spatial Organization. Windsor East.
Chair: **Maurice Yeates**, Queen's University
7:40 **Judith A. Martin**, University of Minnesota, City Ratings and the Quality of Urban Life;
8:00 **Gordon Ewing**, McGill University, National and Regional Differences Between American and Canadian Cities;
8:20 **Timothy J. Bailey**, University of Western Ontario, The Changing Socioeconomic Structure of the City: The Case of Toronto, Canada;
8:40 **Malcolm R. Matthew**, University of Windsor, Toronto Offices: Suburban Patterns and Processes;
9:00 **Gregory P. Stein**, Buffalo State College, **Peggy Keall**, York University, Student Images of Toronto and Buffalo: Sources and Realities.

3012. Remote Sensing/GIS: Applications. Windsor West.
Chair: **Duane F. Marble**, Ohio State University
7:40 **Jon M. Barbour**, University of Colorado, **Jeffrey D. Colby**, University of Colorado, Development of a Geographic Information System Database to Study Fennel Distribution on Santa Cruz Island, California;
8:00 **Ron Terry**, University of Hawaii at Hilo, Satellite Data, GIS, and Natural Area Reserve Management in Hawaii;
8:20 **Michael N. DeMers**, The Ohio State University, GIS Automation of Archived Vegetation Map Information;
8:40 **Kamlesh Lulla**, NASA/Johnson Space Center, Macintosh Based Image Processing for Shuttle Earth-Viewing Photography;
9:00 **Philip L. Jackson**, Oregon State University, **Greg G. Gaston**, Oregon State University, The Design and Implementation of an Aerial Environmental Monitoring and Analysis Program for a Nuclear Power Plant.

3013. Industrial Development. Huron.
Chair: **Andrew J. Krmenec**, Northern Illinois University
7:40 **James O. Huff**, University of Illinois, **Anne S. Huff**, University of Illinois, Geographic Scope as a Key Dimension of Firm Strategy;
8:00 **Edward J. Delaney**, University of Washington, New-Technology Industry Firm Creation, the Search Function in Regions: A Conceptual Framework;
8:20 **J. Douglas Eldridge**, Ohio State University, **John Paul Jones III**, University of Kentucky, **Emilio Casetti**, Ohio State University, The Sources of Manufacturing Employment Change and Their Determinants: Differentials Over Space and Sector;
8:40 **John R. McGregor**, Indiana State University, How Not to Do It: An Example of Local Industrial Development;
9:00 **Howard A. Stafford**, University of Cincinnati, **Qiutao Wu**, University of Cincinnati, Spatial Patterns of Manufacturing Plant Births and Deaths in Ohio.

3014. Regional Development I. Dufferin.
Chair: **Steven L. Driever**, University of Missouri-Kansas City
7:40 **Barbara Becker**, Southwest Missouri State University, Economic Growth in Nonmetropolitan Areas: A Regional Analysis;
8:00 **Anne K. Moss**, University of Colorado, State Economic Development: Barriers to Effective Policy Evaluation;
8:20 **Timothy J. Fik**, University of Florida, **Gordon F. Mulligan**, The University of Arizona, Price Competition and Location: Some Empirical Findings;
8:40 **Hak-Hoon Kim**, University of Arizona, **Gordon F. Mulligan**, The University of Arizona, Sectoral and Functional Variations of Economic Base Multipliers;
9:00 **Siim Soot**, University of Illinois/Chicago, **Ashish Sen**, University of Illinois-Chicago, Labor Shed Model for Assessing Economic Development Impacts.

3015. Politics of Economic Development. Civic Ballroom.
Chair: **Alfonso Gonzalez**, University of Calgary
7:40 **Stanley D. Brunn**, University of Kentucky, Regional and Temporal Patterns of International Commercial Treaties;
8:00 **Davin Ramphall**, Louisiana State University, The Political Economy of Industrialization in Trinidad and Tobago;
8:20 **Yaser M. Najjar**, Framingham State College, Territorial and Spatial Forms of Regional Planning: Western Theories and Jordanian Experience;
8:40 **Colin J.B. Wood**, University of Victoria, **Gerald Walter**, University of Victoria, **Bhansoon Ladavalya**, Chiang Mai University, Mapping the Development Agencies: North Thailand Experiences;
9:00 **Ayse Evrensel-Brown**, Clemson University, Turkey's Membership in the EEC: Obstacles to an Economic Integration.

3016. Fluvial Geomorphology. Conference B.
Chair: **Joe Desloges**, University of Toronto
7:40 **Danny M. Vaughn**, Jacksonville State University, Flood Dynamics of a Concrete-lined, Urban Stream;
8:00 **Adrian A. Wasserman**, Eastern Kentucky University, Hydraulic Geometry in the Sangre de Cristo Range, Colorado;
8:20 **Michael P. O'Neill**, Virginia Tech, Morphology of Tributary Junctions Formed in Cohesive Sediments;
8:40 **Nicholas John Clifford**, Portsmouth Polytechnic, Morphological Significance of Turbulent Channel Flows;
9:00 **Anne Chin**, Arizona State University, Energy Interactions in Step-Pool Streams.

3017. Climate: Historical and Bioclimatology. Conference D.
Chair: **Mark D. Schwartz**, San Francisco State University
7:40 **Louis A. Scuderi**, Boston University, Pre-Telescopic Oriental Sunspot Observations and Volcanism;
8:00 **Cary Jeffrey Mock**, University of Nebraska-Lincoln, Historical Climates of the Northeastern Great Basin: 1830-1853;
8:20 **Conrad T. Moore**, Western Kentucky University, Great Plains Droughts, 1820-65: Documentary and Dendroclimatic Evidence;
8:40 **Vernon Meentemeyer**, University of Georgia, **David Travis**, University of Georgia, Annual Ring Response to Climate by Glaze-Ice Damaged Versus Undamaged Pines;
9:00 **Henri D. Grissino-Mayer**, University of Arizona, Dendroclimatic Reconstruction of Drought for North-Central Georgia, 1825-1986.

3018. Diffusionism. Grand Ballroom West, Section Y.
Chair: **Michael Romanos**, University of Cincinnati
7:40 **Rocky L. Sexton**, Louisiana State University, **Robert Kuhlken**, Louisiana State University, Origin and Diffusion of Zydeco Music;
8:00 **Lawrence T. Lewis**, Western Illinois University, The Diffusion of BITNET/CREN;
8:20 **Roger A. Winsor**, Appalachian State University, Drainage Innovation and Diffusion on the Illinois Prairie;
8:40 **Harry J. Schaleman Jr.**, University of South Florida, **Dewey M. Stowers Jr.**, University of South Florida, Gibsonton, Florida — Seasonal Retreat for the Circus-Carnival World;
9:00 **J. M. Blaut**, University of Illinois-Chicago, The Myth of the European Miracle.

3019. Geography & Artform. Grand Ballroom West, Section Z.
Chair: **Stephen C. Jett**, University of California, Davis
7:40 **David L. Anderson**, University of Tennessee, N. Honerkamp, University of Tennessee, Locations of Indian Rock Art in Chaco Canyon, New Mexico;
8:00 **Bruce Bigelow**, Butler University, Indiana Writers and the Expression of Hoosier Culture;
8:20 **Ramesh C. Dhussa**, Drake University, Geographic Use of Literary Writings: An Indian Example;
8:40 **Andrew Crowhurst**, Emmanuel College, University of Cambridge, Administering the Halls: English Local Government and the Regulation of Music Halls in the 1890s;
9:00 **Malcolm L. Comeaux**, Arizona State University, Graffiti in the Ghetto.

3020. Medical Geography Specialty Group: Comparisons of the Canadian and United States Health Care Systems. Simcoe.
Organizers: **John Eyles**, McMaster University, **Robert Earickson**, University of Maryland-Baltimore Co
Chair: **Michael V. Hayes**, Simon Fraser University
Michael V. Hayes, Simon Fraser University;
Nancy Davis Lewis, University of Hawaii;
Jonathan D. Mayer, University of Washington;
Dona Schneider, Rutgers University.

3021. Population Specialty Group: Housing and Demographic Change in the United States and Canada. Conference G.
Organizer: **Eric G. Moore**, Queen's University
Chair: **Eric G. Moore**, Queen's University
7:40 **Patricia Gober**, Arizona State University, **Kevin E. McHugh**, Arizona State University, The Demography of Housing in Phoenix;
8:00 **Stephen M. Golant**, University of Florida, Housing the Elderly: The United States and Canadian Experience;
8:20 **William A.V. Clark**, University of California, Los Angeles, **Suzanne Davies**, University of California, Los Angeles, The Demography of Housing Consumption;
8:40 **Greg Halseth**, Queen's University, **Evelyn Peters**, Queen's University, Cultural Values, Household Structure and Housing Needs: Canadian Indian People;
9:00 **Brian Ray**, Queen's University, Immigrants and Housing in the Canadian City.

3022. Cultural Ecology and Native Americans Specialty Groups: Sharing Without Melting: Can Encapsulated Societies Survive? Lessons from Native American Experiences. Cinema I.
Organizer: **John D. Wiener**, University of Colorado
Chair: **John D. Wiener**, University of Colorado
7:40 **John D. Wiener**, University of Colorado, The Academics of Encapsulation: Toward a Prescriptive Paradigm;
8:00 **Judith Jacobsen**, University of Wyoming, Indian Water in the West: Encapsulated Societies and Political Dependency;
8:20 **Harvey A. Feit**, McMaster University, Indigenous Dependency and Resistance in a Welfare State: Aboriginal Rights in Northern Quebec and Canada;
8:40 **Joseph Sonnenfeld**, Texas A&M University, A Different Time, a Lesser Space: Resource Pressures and Native American Survival.
Discussants: **Bernard Nietschmann**, University of California-Berkeley, **Douglas Richardson**, Georesearch Inc.

3023. Climate Change and Teleconnections. Conference E.
Chair: **David A. Robinson**, Rutgers University
7:40 **Marilyn Raphael**, The Ohio State University, Sensible Heat Flux and Teleconnection Patterns in the Northern Hemisphere;
8:00 **Marilyn G. Hughes**, Rutgers University, **David A. Robinson**, Rutgers University, Utility of Snow Cover Data in Identifying Climate Change;
8:20 **John A. Harrington Jr.**, Indiana State University, The Arizona Monsoon in a Warmer World;
8:40 **John M. Harlin**, University of Alabama, Warming Trends Resulting From the Greenhouse Effect: Fact Versus Perception;
9:00 **Karen L. O'Brien**, University of Wisconsin-Madison, Assessing the Impacts of Global Warming on Mexico.

3024. The Soviet Union: General Session. Conference C.
Chair: **Philip R. Pryde**, San Diego State University
7:40 Robert R. Myers, West Georgia College, Spatial Characteristics of the Soviet Empire Revealed by Glasnost;
8:00 Ronald Wixman, University of Oregon, Ethno Territorial Strife in the Caucasus and Soviet Territorial Policy;
8:20 Sharon K. Fontanella, United States Military Academy, The Impact of Regional Development on the Soviet's Military Posture in Siberia and the Far East;
8:40 Elena A. Baranov, University of Nebraska/Omaha, The Evolution of a Frontier Settlement: The Case of Vladivostok, 1860-1913;
9:00 Beth Mitchneck, The Brookings Institution, Columbia Univ, Interregional Migration in the Soviet Union: 1965 to 1985.

3025. Soil Development. VIP Room.
Chair: **Wakefield Dort Jr.**, University of Kansas
7:40 David S. Leigh, University of Wisconsin-Madison, Roxana Loess of the Upper Mississippi Valley: Genesis and Paleoenvironment;
8:00 Julie E. Laity, California State University, Northridge, **Vatche Tchakerian**, Texas A&M University, Paleowinds of the Mojave Desert Determined from Ventifacts and Aeolian Sediments;
8:20 J.H. Fonkert, University of Minnesota/MN State Planning Agency, Field Patterns, Soil Landscape Patterns, and Conservation Reserve Eligibility in Two Geomorphic Regions;
8:40 Dennis E. Dahms, University of Kansas, The Role of Holocene Eolian Sediments in Soil Development, Wind River Mountains, Wyoming;
9:00 Randall J. Schaetzl, Michigan State University, **Scott A. Isard**, University of Illinois, Effects of Climate on Strength of the Podzolization Process in Michigan.

3026. Wanderings in the Wilderness. City Hall.
Chair: **Geoffrey Wall**, University of Waterloo
7:40 Gretchen Ahlrichs, University of Texas at Austin, The American Wilderness: An Endangered Species?;
8:00 Kevin F. Burr, University of Victoria, **Philip Dearden**, University of Victoria, The Psychological Dimensions of Wilderness: A Comparative Analysis;
8:20 Jack Gentile, James Madison University, **Marc Nardi**, James Madison University, **Phil Harmon**, James Madison University, **Joe Robb**, James Madison University, Monitoring User Impacts in the St. Mary's Wilderness Area, Virginia;
8:40 Richard K. Ormrod, University of Northern Colorado, **Richard G. Trahan**, University of Northern Colorado, After the Fires: Yellowstone Visitation in 1989;
9:00 David N. Zurick, Eastern Kentucky University, Adventure Travel: Riding a New Tourism Wave.

3027. Homelessness in Los Angeles. Norfolk.
Organizer: **Robin M. Law**, University of Southern California
Chair: **Michael Dear**, University of Southern California
7:40 Jennifer R. Wolch, University of Southern California, **Robin M. Law**, University of Southern California, Homelessness and Economic Restructuring of Downtown Los Angeles;
8:00 Lois M. Takahashi, University of Southern California, The Changing Face of Homelessness: Skid Row, Los Angeles, 1988-89
8:20 Stacy Rowe, University of Southern California, **Jennifer R. Wolch**, University of Southern California, Social Networks in Time and Space: Homeless Women in Skid Row, Los Angeles;
8:40 Susan Ruddick, University of California, Los Angeles, The Production and Reproduction of Urban Images: Placemaking, Urban Redevelopment and the New Homeless.
Discussant: **Hazel A. Morrow-Jones**, The Ohio State University.

8:00 am to 9:20 am

3028. Livestock Questions (Agriculture and Food). Carlton.
Chair: **Jonathan J. Lu**, University of Northern Iowa
8:00 George Aspbury, Illinois State University, **Paul F. Mattingly**, Illinois State University, Spatial Patterns in the Disappearance of Chickens from Illinois Farms;
8:20 Gordon R. Lewthwaite, California State University, Northridge, From Mountain to Market: New Zealand Sheep in Transition;
8:40 Jay R. Lorenz, Oregon State University, Transferring Livestock Guarding Dogs from Europe to the United States;
9:00 Jeffrey D. Hackel, California State University, San Bernardino, Characteristics of Subsistence Poaching in Swaziland.

3029. Glacial and Periglacial Geomorphology I. Wentworth.
Chair: **Paul A. Kay**, University of Nebraska-Lincoln
8:00 Paul A. Kay, University of Nebraska-Lincoln, Avalanche Climate and Variations in the Western United States;
8:20 David R. Butler, University of Georgia, **Stephen J. Walsh**, University of North Carolina, Aspect-Related Morphometric Differences on Snow-Avalanche Paths in Southern Glacier National Park, Montana;
8:40 Raoul Miller, Institute of Arctic and Alpine Research, The Holocene Development of Some Baffin Island Lakes;
9:00 William L. Blewett, Michigan State University, Comparison of Ice Marginal Landforms in Michigan's Northern and Southern Peninsulas.

3030. Aging and the Aged Specialty Group: Business Meeting. Elgin.
Chair: **Judith W. Meyer**, University of Connecticut

3031. Geographic Perspectives on Women Specialty Group: Business Meeting. Dominion South.
Chair: **Joanna Regulska**, Rutgers University

3032. Microcomputers Specialty Group: Business Meeting. Grand Ballroom Centre.
Chair: **Robert Sechrist**, Indiana University of Pennsylvania

3033. Water Resources Specialty Group: Business Meeting. Grand Ballroom East.
Chair: **Graham A. Tobin**, University of Minnesota-Duluth

8:15 am to 9:20 am

3034. Asian Specialty Group: Business Meeting. Dominion North.
Chair: **David Dickason**, Western Michigan University

9:00 am to 5:00 pm

3035. Paper Sales. Sheraton Hall.

3036. Convention Placement Service. Promenade, Lower Concourse.

3037. Exhibits. Sheraton Hall.

9:30 am to 10:45 am

3038. Presidential Plenary Session I: Sharing the North American Continent: Common Concerns, Different Approaches. Grand Ballroom East.
Organizer: **F. Kenneth Hare**, University of Toronto and Trent University

FRIDAY, APRIL 20

9:30 **F. Kenneth Hare**, University of Toronto and Trent University, Canada and the U.S.: Are they Physically Bonded?
10:00 **John E. Hall**, Consul General of the United States, Canada and the U.S.: Are they Psychologically Bonded?

9:30 am to 12:00 noon

3039. Poster Session: Physical Geography I (Geomorphology, Coastal and Marine, Climatology, Water Resources). Sheraton Hall.
David R. Lapen, University of Saskatchewan, **L.W. Martz**, University of Saskatchewan, Modeling Snow Distribution in Prairie Landscapes Using Digital Elevation Models;
Marjorie L. Varuska, US Air Force Academy, **Richard Marston**, University of Wyoming, Recent Trends - Gannett and Dinwoody Glaciers - Wind River Range, Wyoming;
Robert M. Hordon, Rutgers University, The Use of Q20/Q80 Flow-Duration Curve Ratios in Groundwater Studies;
Paul M. Bieneman, Aquinas College, Dune Occurrence on the Navajo Uplands of Northeastern Arizona;
Janet Drake Hamilton, University of Minnesota, Field Measurement of Aeolian Sediment Contributions to Lake Powell;
George Huppert, University of Wisconsin-La Crosse, The Syngenetic Coastal Karst at Point Peron, Western Australia;
Joseph William Nicholas, University of Georgia, Rock Glacier Relative Ages and Fabric Development in the La Sal Mountains, Utah;
Dorothy Sack, University of Wisconsin-Madison, **Ted N. Burr**, Boswell-Olsen Enterprises, **Donald R. Currey**, University of Utah, Threshold-Controlled Shorelines of Lake Bonneville: A Hydrographic-Isostatic Model;
Connie Woodhouse, University of Colorado (INSTAAR), **David K. Yamaguchi**, University of Colorado (INSTAAR), **Marion S. Reid**, University of Colorado (INSTAAR), Tree-Ring Evidence for Submergence of the Southwestern Washington Coast 300 Years B.P.;
Alan F. Arbogast, University of Kansas, Late-Quaternary Stratigraphy in the North Fork Solomon River Valley of Northcentral Kansas;
Michael L. Barnhardt, Memphis State University, Effects of Texture, Compaction, and Vegetative Cover on Gully Erosion on Reclaimed Fields;
Peter T. Soule, University of Alabama, Temporal Relationships Among Multiple Drought Types During an Average Drought;
Thomas B. Williams, Western Illinois University, Microclimatic Temperature Relationships Over Different Surfaces;
William R. Buckler, Youngstown State University, Lake Michigan Shorezone Sand Dunes: A Morphological Classification;
Edward Aguado, San Diego State University, **Jeff Fleming**, University of Wisconsin-Madison, Spatial Snowcover Patterns in the Sierra Nevada and Cascade Ranges;
Gregory J. Carbone, University of South Carolina, The Regional Response of Modelled Soybean Yield to Climate Variability;
Don W. Duckson Jr., Frostburg State University, Temperature Variability in Maryland;
Daniel M. Johnson, Portland State University, Seasonal Precipitation in Spain and Circulation Indexes;
Melvin G. Marcus, Arizona State University, 1948-89 Mass Balance and Climatic Change, Lemon Creek Glacier, Alaska;
Frederick E. Nelson, Rutgers University, **Kenneth M. Hinkel**, University of Cincinnati, **Samuel I. Outcalt**, University of Michigan, The Zero Curtain Effect: Heat and Mass Transfer Across an Isothermal Region in Freezing Soil;
Jim Norwine, Texas A & I University, **Alan Tipton**, Texas A & I University, **Ralph Bingham**, Texas A & I University, The Climate of Southern Texas: Associations with ENSO (El Niño - Southern Oscillation);
Clinton M. Rowe, University of Nebraska-Lincoln, Fractal Forestry: Approximating Canopy Properties for Climate Models;
Gregory A. Plumb, University of Oklahoma, **Michael W. Corkran**, US Army Corps of Engineers, Depicting Shoreline Change from Digitally Encoded Aerial Photo Interpretations;
Denis J. Gratton, University of Waterloo, **Philip J. Howarth**, University of Waterloo, Integration of Digital Elevation Model (DEM) Parameters and Landsat Imagery in a GIS for Mapping Mountain Glaciers;
Susan M. Berta, Indiana State University, **Dennis L. Skelton**, Indiana State University, Utilization of a GIS Approach for Modeling Avalanche Occurrence.

3040. Field Trip 16A: Teacher Field Trips: A Visit to the New Educational Technological Laboratory.
Organizer: **Lorraine Clarkson**, Toronto Urban Studies Centre/Board of Education

11:00 am to 12:40 am

3041. Socialist Geography Specialty Group: Engaging Racism. Kent.
Organizers: **J. M. Blaut**, University of Illinois-Chicago, **Ben Wisner**, Hampshire College
Chairs: **J. M. Blaut**, University of Illinois-Chicago, **Ben Wisner**, Hampshire College
Ben Wisner, Hampshire College;
Mickey Lauria, University of New Orleans;
Bryan Higgins, State University of New York;
J. M. Blaut, University of Illinois-Chicago;

3042. Political Geography and Socialist Geography Specialty Groups: Money Makes the World Go Round: The Geopolitics of International Finance. Peel.
Organizer: **Susan Roberts**, Syracuse University
Chair: **Susan Roberts**, Syracuse University
Stuart Corbridge, Cambridge University;
Gearold O. Tuathail, Virginia Polytechnic Institute;
Paul Susman, Bucknell University;
Nigel Thrift, University of Bristol;
Barney Warf, Kent State University.

3043. Recreation, Tourism and Sport Specialty Group: Canadian-U.S. Perspectives on Recreational Travel and Resort Development. Grand Ballroom East.
Organizer: **Rudi Hartmann**, University of Colorado
Chair: **Alison Gill**, Simon Fraser University
11:00 **Geoffrey Wall**, University of Waterloo, Economic and Perceptual Dimensions of Canadian and American Travellers' Souvenir Purchases;
11:20 **Kate Cooksley**, Simon Fraser University, **Rudi Hartmann**, University of Colorado, Ski Resorts of the North American West: Vail and Whistler as Places to Live;
11:40 **Susan Edwards**, University of Colorado, Impacts of Highway Design on the Traveler and Landscape;
12:00 **Habis S. Samawi**, Jordan University, **Robert Donell**, Framingham State College, **Yaser M. Najjar**, Framingham State College, Perceptions and Value Systems of American Society Toward Recreation Activities: The Case of State Parks in Massachusetts.
Discussant: **Peter E. Murphy**, University of Victoria.

3044. Water Resources, Aging and Aged, Geography in Higher Education Specialty Groups: The Great Lakes: Socio-Economic Impacts of Fluctuating Levels and Flows. Grand Ballroom Centre.
Organizer: **Kim Irvine**, State University College at Buffalo
Chair: **Kim Irvine**, State University College at Buffalo

11:00 Anthony J. Eberhardt, US Army Corps of Engineers, Great Lakes Hydrology and Hydraulics;
11:15 Bradford S. Price, US Army Corps of Engineers, **Robert Chang**, Ministry of Natural Resources, **Kim Irvine**, State University College at Buffalo, **Tom Muir**, Environment Canada, **Ronald Guido**, US Army Corps of Engineers, Impacts of Fluctuating Great Lake Levels and Flows on Electric Power Generation;
11:30 Michael S. Pelone, US Army Corps of Engineers, **Tom Muir**, Environment Canada, **John Greenwood**, Freshwater Press, Inc., Impacts of Fluctuating Water Levels of the Great Lakes on Transportation;
11:45 Jonathan Brown, US Army Corps of Engineers, **Anne Sudar**, Environment Canada, **Gary Jones**, Environment Canada, **Tommy Brown**, Cornell University, Impacts of Fluctuating Water Levels of the Great Lakes on Recreation;
12:00 Anne Sudar, Environment Canada, **Gary Jones**, Environment Canada, A Census and Survey of Canadian Great Lakes - St. Lawrence River Riparians;
12:15 Tom Muir, Environment Canada, Implications of Sustainable Development for Planning and Impact Assessment Under Uncertainty.

3045. GIS Specialty Group Special Session. Cinema II.
Organizers: **Lawrence E. Band**, University of Toronto, **Jerome E. Dobson**, Oak Ridge National Laboratory
Chair: **Lawrence E. Band**, University of Toronto
11:00 Nicholas R. Chrisman, University of Washington - Seattle, Developing a Geography of Geographic Information;
11:20 Robert W. Peplies, East Tennessee State University, **Donald Kell**, City of Johnson City, The TVA Rural Land Classification System and GIS—What If!;
11:40 Grant Ian Thrall, University of Florida-Gainesville, Real Estate Analysis with GIS;
12:00 Daniel B. Kjerne, University of Washington, **Kirsty Burt**, City of Bellevue, High Touch/High Tech: Management Revolution in GIS;
12:20 Larry G. O'Brien, University of Newcastle, Design Issues in Developing a GIS for People with Special Needs.

3046. Transportation Specialty Group: Canadian and U.S. Transportation Systems: Interrelationships and Comparisons. VIP Room.
Organizer: **Andrew R. Goetz**, University of Denver
Chair: **Andrew R. Goetz**, University of Denver
11:00 Charles W. Boas, York College of Pennsylvania, The Railway Interrelations of the United States and Canada: A Re-Evaluation of the 1936 Wilgus Study;
11:20 Larry E. McKeown, University of Toronto, Public Transit Subsidies: A Comparison of American and Canadian Policy;
11:40 Janos Wimpffen, KJS Associates, Inc., International Transport Regimes and Contiguous Countries: Goods Movement Betwen the United States and Canada;
12:00 Andrew R. Goetz, University of Denver, The Canadian and US Experiences with Airline Deregulation.

3047. Aging and Population Specialty Groups: Human Migration in the U.S. and Canada. Carlton.
Organizers: **John F. Watkins**, University of Kentucky, **Kevin E. McHugh**, Arizona State University
Chair: **John F. Watkins**, University of Kentucky
11:00 Kevin E. McHugh, Arizona State University, **Robert C. Mings**, Arizona State University, Comparing American and Canadian Snowbirds in Arizona;
11:20 David H. Kaplan, University of Wisconsin-Madison, Language and Migration in Canada: Data from the 1986 Census;
11:40 K. Bruce Newbold, McMaster University, **Kao-Lee Liaw**, McMaster University, Characteristics of Primary, Return and Onward Migrations of the Canadian Interprovincial System: 1976-81;
12:00 Alain Belanger, University of Colorado, Boulder, Longitudinal Analysis of Sequences of Household Migration in the United States.

3048. Urban Geography Specialty Group: North American Themes. Conference F.
Organizer: **Neil Smith**, Rutgers University
Chair: **H. Briavel Holcomb**, Rutgers University
11:00 Michael Romanos, University of Cincinnati, **Carla Chifos**, Cornell University, **Heidi Van Keuren**, University of Cincinnati, The Role of Growth Perceptions in the Emergence of Metrotowns;
11:20 Paul David Carls, Rutgers University, Declining Suburbs: Disinvestment in the Inner Suburbs of Camden County, New Jersey;
11:40 Evelyn Peters, Queen's University, Residential Location of Urban Indians, Regina and Saskatoon;
12:00 John Belec, Nipissing University College, Federal Housing Policy and the North American City: A Comparison of Outcomes in the United States and Canada During the Formative Years.

3049. Applied Geography Specialty Group: Nature and Role of the "Geo-Factor" in Public Policy Formation I: U.S. Windsor West.
Organizer: **Barry Wellar**, University of Ottawa
Chair: To Be Announced,
Barry Wellar, University of Ottawa;
Thomas J. Baerwald, National Science Foundation;
Kingsley E. Haynes, Boston University;
Michael Greenberg, Rutgers University;
John S. Adams, University of Minnesota;
Ronald F. Abler, Association of American Geographers;
Gordon Wolman, The Johns Hopkins University.

3050. Climate Specialty Group: Sharing North American Climate. Dominion South.
Organizers: **Anthony J. Brazel**, Arizona State University, **Stewart J. Cohen**, Canadian Climate Centre
Chairs: **Anthony J. Brazel**, Arizona State University
11:00 D. K. Dawson, Canadian Climate Centre, Director, Sharing the North American Climate.

3051. Special Session on Toronto Among North American Cities: Managing Rapid Growth. Dominion North.
Organizer: **James Lemon**, University of Toronto
Chair: **Larry S. Bourne**, University of Toronto
11:00 John Mercer, University of Victoria, American and Canadian Cities: Near Neighbours but Worlds Apart?;
11:20 James Lemon, University of Toronto, Toronto: The City That Works;
11:40 Richard Gilbert, Metropolitan Toronto Council, Global Warming and the Need to Make Toronto into a Compact, European-Style City Again;
12:00 Gardner Church, Province of Ontario, Deputy Minister, Form Before Function: The Merits of Planning Toronto's Region.

3052. Sharing the North American Continent: The U.S. - Mexican Border Region I. Elgin.
Organizer: **Vera K. Pavlakovic**, University of Arizona
Chair: **Richard W. Janson**, Kent State University
11:00 Leland R. Pederson, University of Arizona, Borderline and Borderland: A Perspective on Geographic Research in the U.S.-Mexico Boundary Zone;
11:20 Raul A. Fernandez, University of California, Irvine, The

Imperial-Mexicali Valleys: 20th Century Colonization;
11:40 Robert South, University of Cincinnati, Mexico's Maquiladoras-Dependency Development.

3053. Natural Resources and the Canada-U.S. Free Trade Agreement. Wentworth.
Organizer: **Robert J. P. Gale**, University of Toronto
Chair: **A. P. Lino Grima**, University of Toronto
11:00 John Ryan, University of Winnipeg, Continentalism and the Free Trade Agreement: The Effect on Canada;
11:20 Robert J. P. Gale, University of Toronto, Canadian Environmental Management and the Free Trade Agreement;
11:40 Frank J. Calzonetti, West Virginia University, Canadian-U.S. Electricity Trade and the Free Trade Agreement;
12:00 Frank Quinn, Inland Waters Directorate, Environment Canada, Will Free Trade Drink Canada Dry?

3054. Native American Specialty Group: Special Session on Native Americans. Norfolk.
Organizers: **Thomas Ross**, Pembroke State University, **Tyrel G. Moore**, University of North Carolina at Charlotte
Chairs: **Thomas Ross**, Pembroke State University, **Tyrel G. Moore**, University of North Carolina at Charlotte
11:00 Stephen C. Jett, University of California, Davis, The Spread of Metal Farming Tools Among the Navajo;
11:20 Kenneth C. Dagel, University of North Dakota, Ethnogeography of the Mandan and Hidatsa: 1738-1889;
11:40 Nancy L. Woolworth, University of Minnesota, Estimating Dakota, Nakota and Lakota Populations, 1642-1862;
12:00 J.M. Jacobi, University of Tennessee, Economic Diversity Among the Cherokee in Nineteenth Century Southern Appalachia;
12:20 George A. Van Otten, Northern Arizona University, Current Trends Favor Native American Agriculture in Arizona.

3055. Medical Geography Specialty Group: Health Problems That Do Not Respect National Boundaries. Simcoe.
Organizers: **Robert Earickson**, University of Maryland-Baltimore Co, **John Eyles**, McMaster University
Chair: **Robert Earickson**, Univ of Maryland-Baltimore Co
11:00 Dona Schneider, Rutgers University, **Christine Hampson**, Brock University, Pediatric Cancer Mortality: New Jersey and the United States, Ontario and Canada;
11:20 S. Martin Taylor, McMaster University, Geography and Health Promotion: The Example of COMMIT;
11:40 Michael V. Hayes, Simon Fraser University, **S. Manson Williams**, University of British Columbia, Healthy Community Indicators: The Perils of the Search and the Paucity of the Find;
12:00 Wilbert M. Gesler, University of North Carolina-Chapel Hill, The Role of Language in Health Care Delivery.

3056. Env. Perception, Behavioral, Cultural Geo., Latin Am., Native Am. Specialty Groups and IGU Comm on the World Political Map: Americanite/Americanness/Americanidad European and Native Indian Roots on American Identity: Exploration and Settlement. Civic Ballroom.
Organizers: **Anne Buttimer**, University of Ottawa, **Vincent Berdoulay**, University of Ottawa
Chair: **Anne Buttimer**, University of Ottawa
11:00 R. C. Harris, University of British Columbia, The Reshaping of Europe in North American Space;
11:20 Karl W. Butzer, University of Texas-Austin, Change and Continuity in New Spain;
11:40 Vincent Berdoulay, University of Ottawa, **Louis Dupont**, St. Lawrence University, The Myth of America: From France to Quebec.

3057. AAG Archives and Association History Committee: Geographic Thought in the U.S. and Canada: Problems and Prospects of 500 Years of Continental Sharing. City Hall.
Organizer: **Martin S. Kenzer**, University of Southern California
Chair: **David Hornbeck Jr.**, California State University-Northridge
11:00 G. Malcolm Lewis, University of Sheffield, Early Geographies of North America: Amerindians, Explorers and Geography Makers;
11:20 Cotton Mather, New Mexico Geographical Society, Geographic Aspects: Continental Sharing by United States and Canada;
11:40 William R. Code, University of Western Ontario, National Distinctions in North American Urbanism.
Discussant: **Victor Konrad**, University of Maine.

3058. Soviet and East European Specialty Group: Geographical Dimensions of Perestroyka: I. Conference C.
Organizers: **Michael J. Bradshaw**, University of Birmingham, **Gary Hausladen**, University of Nevada-Reno
Chair: **Gary Hausladen**, University of Nevada-Reno
11:00 Michael J. Bradshaw, University of Birmingham, Perestroyka and Regional Geography;
11:20 Ronald Liebowitz, Middlebury College, Spatial Inequality in the Gorbachev Era;
11:40 Robert Kaiser, Kennan Institute, Nationalism: The Challenge to Soviet Federalism.
Discussant: **Matthew Sagers**, Bureau of the Census.

3059. Hazards Specialty Group: U.S.-Canada Trans Boundary Hazards: A Policy Perspective. Conference D.
Organizer: **Allen L. White**, Clark University
Chair: **Allen L. White**, Clark University
Allen L. White, Clark University;
Alex Manson, Environment Canada;
Ron Shimizu, Environment Canada;
Michael Keating, Environmental Consultant/Canada.

3060. Biogeography Specialty Group: Spatial and Temporal Patterns in Vegetation. Conference E.
Organizer: **Thomas T. Veblen**, University of Colorado
Chair: **Keith S. Hadley**, University of Colorado
11:00 Kenneth R. Young, University of Colorado, The Roles of Forest Disturbances at a Tropical Timberline;
11:20 Andrea H. Lloyd, Dartmouth College, The Influence of Bedrock on Peatland Community Structure: A Biogeographical Comparison of Two Fens in Western Newfoundland;
11:40 Susan W. Beatty, University of Colorado, Ten Years of Change in a Deciduous Forest Understory;
12:00 David Shankman, University of Alabama, Channel Migration and the Regeneration of Bald Cypress in Western Tennessee;
12:20 Robert E. Frenkel, Oregon State University, **Janet C. Morlan**, Oregon State University, Response of Salt Marsh Vegetation to Altered Tidal Regime.

3061. Population Specialty Group: Refugees in North America: Macro and Micro Perspectives. Conference G.
Organizers: **William B. Wood**, Office of The Geographer, **Richard Jones**, University of Texas at San Antonio
Chair: **William B. Wood**, Office of The Geographer
11:00 John Morris, York University, The Geographical Experience of Refugees Resettling in Toronto: Preliminary Understanding;
11:20 Kristen L. Monzel, Syracuse University, "Kuv Hais Lus Hmoob Me Me Xwb":Qualitative Fieldwork in a Hmong Community;

11:40 Ellen Percy Kraly, Colgate University, US Refugee Policies and Migration Since World War II;
12:00 Howard Adelman, Centre for Refugee Studies, Canadian Refugee Policies: The Last Ten Years.
Discussant: **Lubomyr Y. Luciuk**, Queen's University.

3062. Computer Cartography. Kenora.
Chair: **Cynthia A. Brewer**, Michigan State University
11:00 James Mower, State University of New York at Albany, Implementing Automated Cartographic Name Placement on the Connection Machine;
11:20 Chyan Victor Wu, State University of New York at Buffalo, Positional Prioritization and Other Components in Point-Feature Name Placement on Maps;
11:40 Susan Kennedy, University of Vermont, Bayes-Adjusted Choropleth Maps;
12:00 Ruth Anderson Rowles, University of Kentucky, Regions and Choropleth Maps;
12:20 Mark B. Lindberg, George Mason University, Optimal Classification Revisited.

3063. Regional Development II. Dufferin.
Chair: **Ernest H. Wohlenberg**, Indiana University
11:00 Michele M. Masucci, West Georgia College, Regional Planning Decisionmaking Perspectives;
11:20 Donald W. Buckwalter, Indiana University of Pennsylvania, Relationships Between Prosperity and Migration in North American Metropolitan Areas;
11:40 Kenneth Johnson, S.U.N.Y.-Oneonta, A Comparative Analysis of State-Sponsored Regional Development Programs in the United States;
12:00 Betty Waldron, University of Florida, Local Planning for Economic Development: Florida's Growth Management Act in Practice;
12:20 Martin Hessels, University of Utrecht, Business Services and Economic Development: The Case of Baltimore, Maryland.

3064. Historical Cartography. Spin Drift (4th floor)
Chair: **James E. Lightfoot**, University of Central Arkansas
11:00 Stephen Matchak, Salem State College, Cartographic Training in the Early Nineteenth Century;
11:20 Daniel Hopkins, University of Missouri-Kansas City, Incompatibility of Prescriptive Rights and an Early Grid Survey System;
11:40 Borden D. Dent, Georgia State University, Linguistic Geography and the Thematic Cartographer: A Review of the Design Challenge Lurking in Linguistic Mapping;
12:00 Carlos Rincon, University of Texas, The Territory and Environment of San Miguel Tulancingo.

3065. GIS Education. Grand Ballroom West, Section Z.
Chair: **Michael N. DeMers**, The Ohio State University
11:00 Michael R.C. Coulson, University of Calgary, Cartographic Instruction and the Smorgasbord Curriculum: The Case for a Foundations Course in Geographic Techniques;
11:20 J.S. Sandhu, The Ohio State University, Building an Instructional GIS: Lessons Learned from OSU Map for the PC;
11:40 Frank Gossette, California State University, Long Beach, The Use of Microcomputers in Geographic Education;
12:00 Alan K. Edmonds, The Ohio State University, MenuMAP: A Cartographic Modelling Interface for the Map Analysis Package;
12:20 David H. Douglas, University of Ottawa, A Developing World Reflection on the Role and Substance of Geomatics.

3066. Rural Development, Canadian, and Contemporary Agriculture and Rural Land Use SGs: Rural Development Along the US-Canadian Border. Grand Ballroom West, Section X.
Organizers: **Paul Frederic**, University of Maine-Farmington, **Thomas Rumney**, State University of New York, Plattsburgh, **M. Duane Nellis**, Kansas State University
Chair: **William D. Romey**, St. Lawrence University
11:00 Harold A. Meeks, University of Vermont, Land Along the Line: The Vermont-Quebec Border;
11:20 Floyd W. Dykeman, Mount Allison University, Rural Grassroots International Cooperation: The Case of Charlotte County, New Brunswick and Washington County, Maine;
11:40 Thomas Rumney, State University of New York, Plattsburgh, Canadian Industrial Expansion into Northern New York;
12:00 Douglas B. McDonald, Ogdensburg Bridge and Port Authority, Tourism Planning in the St. Lawrence River Valley: Alternative Approaches.
Discussant: **Courtice G. Rose**, Bishop's University.

3067. Canadian Historical Geography. York.
Chair: **John P. Radford**, York University
11:00 Sherry Olson, McGill University, **Patricia A. Thornton**, Concordia University, Geographic and Social Space in 19th Century Montreal;
11:20 Daniel Hiebert, University of British Columbia, The Social Geography of Toronto, 1901-1931;
11:40 Susan Wurtele, Queen's University, Railways and the Settlement of Canada in the Post-World War I Era;
12:00 Heather Nicol, Queen's University-Dept of Geography, Urban Enterprise in Eastern Ontario, 1849-1920: A Case Study of the Institutionalization of Development Policies;
12:20 Robert Summerby-Murray, University of Toronto, Rural Ontario Roads, 1850-1930: A Hierarchy of Municipal Responsibilities.

3068. Faculty, Alumni and Friends of the Department of Geography, University of Illinois at Urbana-Champaign: Roepke Lecture in Economic Geography. Cinema I.
Organizer: **Geoffrey J. D. Hewings**, University of Illinois
Chair: **Geoffrey J. D. Hewings**, University of Illinois
11:00 Eric Sheppard, University of Minnesota, Modeling the Capitalist Space Economy: Bringing Society and Space Back In.
Discussants: **Donald W. Jones**, Oak Ridge National Laboratory, **Meric S. Gertler**, University of Toronto.

3069. Asian Specialty Group (Southeast Asia Division): Southeast Asia: Social and Economic Issues. Grand Ballroom West, Section Y.
Organizer: **Thomas R. Leinbach**, University of Kentucky
Chair: **Thomas R. Leinbach**, University of Kentucky
11:00 Miriam K. Lo, Mankato State University, Malaysia's New Economic Policy: Its Impact on Chinese Entrepreneurship;
11:20 Jon D. Goss, University of Hawaii, Property Relations in a Metro Manila Squatter Settlement;
11:40 Frank D. Zinn, Michigan State University, **John D. Nystuen**, The University of Michigan, Computer-Aided Financial Advice for Women's Groups in Indonesian Villages;
12:00 Ralph Lenz, Wittenberg University, The Journey to Work in Jakarta's KAMPUNGS.
Discussant: **T. G. McGee**, University of British Columbia.

3070. Geomorphology Specialty Group: Problems in Geoarchaeology. Conference B.
Organizers: **William C. Johnson**, University of Kansas, **David W. May**, University of Northern Iowa
Chair: **Curt J. Sorenson**, University of Kansas
11:00 Joe Alan Artz, The University of Iowa, Holocene Alluvial Chronologies from North Dakota: Implications for the Timing of Major Episodes of Regional Geomorphic Change;
11:20 Michael D. Blum, University of Texas at Austin,

Landscape Evolution and Prehistoric Settlement Along the Colorado and Concho Rivers of West Texas;
11:40 **Anthony M. Davis**, University of Toronto, **R.G.V. Hancock**, University of Toronto, **C.A. Stimmell**, University of Toronto, The Use of Geochemical Signatures in Stratigraphic Investigations of Archeological Sites in Southern Hokkaido, Japan;
12:00 **David W. May**, University of Northern Iowa, The Paucity of Stratified Clovis Sites in Valleys on the Central Great Plains;
12:20 **William C. Johnson**, University of Kansas, Biogeography and Geomorphology of Late-Pleistocene Megafaunal Remains and Potential Paleoindian Association in the East-Central Great Plains.

3071. Political and Socialist Geography Specialty Groups: Environmental Politics. Huron.
Organizer: **Robert W. Lake**, Rutgers University
Chair: **Michael Heiman**, Dickinson College
11:00 **Marvin Waterstone**, University of Arizona, Where One Stands Depends on Where One Sits: Environmental Politics and Contextual Decision Making;
11:20 **Robert W. Lake**, Rutgers University, **Rebecca A. Johns**, Rutgers University, Legitimation Conflicts: The Politics of Hazardous Waste Siting Law;
11:40 **Stephanie Pincetl**, University of California, Los Angeles, The Progressive Paradigm and Environmental Politics;
12:00 **Scott Carlin**, Clark University, **Jacque Emel**, Clark University, Restructuring Nature: Environmental Politics in Boston.
Discussant: **Margaret FitzSimmons**, University of California - Los Angeles.

3072. Religion and Landscape. Oxford.
Chair: **Richard T. Lewis**, Kent State University
11:00 **Frank J. Pucci**, University of Minnesota, An Historical Geography of the Presidios Along the Northern Frontier of New Spain from 1759 to 1788;
11:20 **Barbara A. Weightman**, California State University, Fullerton, Religious Symbolism in Landscape and Lifeworlds: A Humanistic Perspective;
11:40 **Susan Wiley Hardwick**, California State University-Chico, The Religious Geography of Russian Pentecostals in the American West;
12:00 **Gail S. Sechrist**, Indiana University of Pennsylvania, Church Names in Western Pennsylvania;
12:20 **Roger W. Stump**, State University of New York at Albany, Patterns of Religious Affiliation in the Montreal Metropolitan Area.

3073. Modelling of Geomorphic Processes. Windsor East.
Chair: **Athol D. Abrahams**, State University of New York at Buffalo
11:00 **Normand Bergeron**, University at Buffalo, The Use of Principal Components Analysis to Generate Multivariate Rating Equations for Predicting Sediment Loads;
11:20 **Rolf Schroeder**, Arizona State University, Investigation of Local Reach Variables, Eifel, West Germany;
11:40 **David W. LeBoutillier**, University of Florida, **Peter Waylen**, University of Florida, An Empirical Model for Flow-Frequency Analysis in British Columbia;
12:00 **Dirk H. De Boer**, University of Alberta, Constraints on Spatial Scale Transference in Process Geomorphology;
12:20 **David Bennett**, University of Iowa, An Adaptive Physically-Based Model for the Simulation of High Energy Watersheds.

12:55 am to 2:35 pm

3074. Phoenix Group: Surviving the Tenure Process. Grand Ballroom West, Section Y.
Organizer: **Lisa Graumlich**, University of Arizona
Chair: **Lisa Graumlich**, University of Arizona
Diana M. Liverman, Pennsylvania State University;
Laura E. Conkey, Dartmouth College;
Fred Shelley, University of Southern California;
Jeanne Kay, University of Nebraska-Lincoln;

3075. Africa: Economic Development. Cinema I.
Chair: **Debnath Mookherjee**, Western Washington University
12:55 **Marilyn Silberfein**, Temple University, District Level Locational Strategies in Sierra Leone;
1:15 **J. Harold Leaman**, Villanova University, Villagization in Ethiopia and the Role of International Aid;
1:35 **Barbara E. McDade**, University of Texas-Austin, A Role for Traditional Crafts Sectors in Africa's Modern Economic Development Plans;
1:55 **Kent H. Butts**, Army War College, Civic Action Programs as Instruments of Development: The Case of Africa;
2:15 **Bernard I. Logan**, University of Georgia, The Impacts of Economic Reform in Sub-Saharan Africa.

3076. Mathematical Models and Quantitative Methods Specialty Group: The Future of Spatial Analysis. Grand Ballroom East.
Organizers: **Peter Rogerson**, State University of New York at Buffalo, **A. Stewart Fotheringham**, State University of New York at Buffalo
Chair: **A. Stewart Fotheringham**, State University of New York at Buffalo
Gary L. Gaile, University of Colorado;
Reginald Golledge, University of California, Santa Barbara;
Daniel Griffith, Syracuse University;
James O. Huff, University of Illinois;
John Odland, Indiana University;
Gerard Rushton, University of Iowa.

3077. Europe in the 1990s: A Geographical Interpretation. Grand Ballroom West, Section X.
Organizer: **George W. Hoffman**, Professor Emeritus, University of Texas at Austin
Chair: **George W. Hoffman**, Professor Emeritus, University of Texas at Austin
Vincent H. Malmstrom, Dartmouth College;
Thomas M. Poulsen, Portland State University;
Craig ZumBrunnen, University of Washington;
Anthony R. De Souza, National Geographic Society;
George W. Hoffman, Professor Emeritus, University of Texas at Austin.

3078. Cartography and GIS Specialty Groups: Educational Essentials for Today's (and Tomorrow's) Jobs in Cartography and GIS. Cinema II.
Organizers: **Pat Gilmartin**, University of South Carolina, **David Cowen**, University of South Carolina
Chair: **Pat Gilmartin**, University of South Carolina
Jack Dangermond, ESRI;
Jean Paul Lauzon, Prime-Wilde;
Duane F. Marble, Ohio State University;
Robert W. Marx, US Census Bureau;
Joel L. Morrison, USGS/National Mapping Division;
Barbara B. Petchenik, Donnelley Cartographic Services;

3079. Historical Geography of the American West. York.
Organizer: **Richard H. Jackson**, Brigham Young University

Chair: **Richard H. Jackson**, Brigham Young University
12:55 L.A. Rosenvall, University of Calgary, Toponymy of Mormon Settlement;
1:20 Richard H. Jackson, Brigham Young University, Territorial Change in the Northern Ute Reservation: Causes and Implications;
1:45 J. Matthew Shumway, Indiana University, The Changing Demographic Characteristics of the Navajo Nation;
2:10 Marshall Bowen, Mary Washington College, Desert Land for Sale.

3080. Native American and Cultural Ecology Specialty Groups: Recent Research on North American Native Populations: Observations on Canadian and United States Experiences at the Macro-Scale Level. Norfolk.
Organizer: **Martha L. Henderson**, University of Minnesota-Duluth
Chair: **Martha L. Henderson**, University of Minnesota-Duluth
12:55 Terry G. Jordan, University of Texas-Austin, The Amerindian Contribution to Traditional Southern Culture and Regionalism;
1:20 Arthur J.(Skip) Ray, University of British Columbia, Changing Man/Land Relationships in the Canadian Fur Trades: A Comparative Examination;
1:45 Harry Swain, Indian & Northern Affairs/Canada, Canada's Indians and Inuit: Their Lands and Resources;
2:10 Stephen Cornell, University of California-San Diego, Determinants of Development Success on United States Indian Reservations.

3081. Contemporary Agriculture and Rural Land Use Specialty Group: Social and Economic Restructuring of Rural Areas. Carlton.
Organizer: **Owen J. Furuseth**, University of North Carolina-Charlotte
Chair: **Ingolf Vogeler**, University of Wisconsin-Eau Claire
12:55 John Fraser Hart, University of Minnesota, The Changing Function of Small Towns in Minnesota;
1:20 Harley Johansen, University of Idaho, **Arvo Naukkarinen**, Oulu University, Finland, **Taina Vare**, Oulu University, Development Efforts and Business Trends in Finland's Rural Communes;
1:45 Owen J. Furuseth, University of North Carolina-Charlotte, Place Inequality in Rural North Carolina;
2:10 Paul Cloke, St. Davids University College, **V. Cloke**, Journal of Rural Studies, Social Recomposition and Political Leadership in Rural Britain.

3082. Urban Geography Specialty Group: Southern California: Urban and Regional Development Processes. Conference E.
Organizer: **Allen J. Scott**, University of California-Los Angeles
Chair: **Allen J. Scott**, University of California-Los Angeles
12:55 Darrel Hess, University of California-Los Angeles, Korean Immigrant Entrepreneurs in the Los Angeles Garment Industry;
1:15 Jan Maarten De Vet, University of California-Los Angeles, Innovation and New Firm Formation in Southern California's Medical Device Industry;
1:35 Beverley Pitman, University of California-Los Angeles, The Contested Rise of Los Angeles in the Global Fashion System;
1:55 Robin M. Law, University of Southern California, **Jennifer R. Wolch**, University of Southern California, Urban Restructuring and the Geography of Low-Skill Work;
2:15 Roger Keil, Johann Wolfgang Goethe University-Frankfurt, "A Hard Rain's A'Gonna Fall?" Rhetoric, Discourse and Politics of Internationalization in Los Angeles.

3083. Socialist Geography Specialty Group: Modes of Social Regulation: Contradictions, Ruptures and Interventions. Windsor East.
Organizer: **Julie Graham**, University of Massachusetts
Chair: **Margaret FitzSimmons**, University of California - Los Angeles
Cindi R. Katz, City University of New York;
Tim Lewington, Syracuse University;
Julie Graham, University of Massachusetts.

3084. Applied Geography Specialty Group: Nature and Role of the "Geo-Factor" in Public Policy Formation II: Canada. Windsor West.
Organizer: **Barry Wellar**, University of Ottawa
Chair: **Peter J. Smith**, University of Alberta
Barry Wellar, University of Ottawa;
Walter G. Hardwick, University of British Columbia;
Maurice Yeates, Queen's University;
J. Gordon Nelson, University of Waterloo;
Peter Adams, Trent University.

3085. Political Geography Specialty Group: The State, Regulation and the Power of Place. Wentworth.
Organizer: **Nicholas K. Blomley**, Simon Fraser University
Chair: **John Brohman**, Simon Fraser University
12:55 Nicholas K. Blomley, Simon Fraser University, Federalism, Formalism and the Geography of Regulation;
1:15 Andrew Jonas, Clark University, Local Interests and State Territorial Structures: Some Conceptual and Empirical Issues;
1:35 Vera Chouinard, McMaster University, State Regulation and the Politics of Law in Localities: Legal Clinics in Hamilton and Toronto.
Discussant: **Andrew Kirby**, University of Arizona.

3086. Cultural Geography Specialty Group: Critical Perspectives on Popular Culture. Dominion North.
Organizer: **Deryck W. Holdsworth**, Pennsylvania State
Chair: **Deryck W. Holdsworth**, Pennsylvania State University
12:55 Mireya Folch-Serra, Queen's University, A Dialogical Landscape of the Catalan Pyrenees;
1:15 Ulf Strohmayer, Pennsylvania State University, Iconographies of Power;
1:35 Larry R. Ford, San Diego State University, Deconstructing the Strip;
1:55 Randall Mason, Pennsylvania State University, A Landscape of Leisure in Historical Perspective: Understanding Atlantic City.
Discussant: **Mona Domosh**, San Diego State University.

3087. Sharing the North American Continent: The U.S.-Mexican Border Region II. Elgin.
Organizer: **Vera K. Pavlakovic**, University of Arizona
Chair: **Leland R. Pederson**, University of Arizona
12:55 Lay James Gibson, University of Arizona, **James T. Peach**, New Mexico State University, **Christopher A. Erickson**, New Mexico State University, Peso Devaluations and Economic Instability in the US-Mexico Borderlands;
1:15 Vera K. Pavlakovic, University of Arizona, Transborder Outshopping of Maquila Employees: Impacts on Arizona's Border Communities;
1:35 Richard W. Janson, Kent State University, Ohio Firms and Their Maquiladora Experience: An Ohio Perspective;
1:55 Robert E. Norris, Oklahoma State University, Maquiladoras: Spatial and Temporal Changes in the US-Mexican In-Bond Industry.

3088. Geography of Sport. Huron.

Organizer: **John Rooney**, Oklahoma State University

Chair: **Theodore Goudge**, Northwest Missouri State

12:55 **Robert McClure**, Oklahoma State University, An Analysis of Golf Accessibility in the Pacific Northwest;

1:15 **Andrew Snook**, National Golf Foundation and Univ of Florida, **Peter Waylen**, University of Florida, Southerners Rule UK? Geographic Analysis of Success in the English Football League 1921-1987;

1:35 **John Rooney**, Oklahoma State University, **Richard Pillsbury**, Georgia State University, The Atlas of American Sport;

1:55 **Carl F. Ojala**, Eastern Michigan University, **Michael T. Gadwood**, Eastern Michigan University, The Geography of Major League Baseball Player Production: 1876-1989;

2:15 **Elwood J.C. Kureth**, Eastern Michigan University, **Robert Ferrett**, Eastern Michigan University, The National Hockey League - A Geographical Case Study of Player Personnel Demographics.

3089. Coastal and Marine Geography: Issues in Coastal Management. Simcoe.

Organizers: **Bernard O. Bauer**, University of Southern California, **Paul A. Gares**, Colgate University

Chair: **Paul A. Gares**, Colgate University

12:55 **Norbert P. Psuty**, Rutgers University, **Vasantt Jogoo**, Rutgers University, International Concern for Sea-Level Rise Issues;

1:15 **Gary W. Yohe**, Wesleyan University, U.S. Economic Vulnerability to Greenhouse Induced Sea Level Rise;

1:35 **M. Eugenia S.A. Moreira**, Universidade de Lisboa, Impacts of the Potential Sea-Level Rise on the Portuguese Coastal Wetlands;

1:55 **Paul D. Knuth**, Edinboro University of Pennsylvania, Inshore Response to Offshore Segmented Breakwaters, Presque Isle Peninsula, Pennsylvania;

2:15 **Neal Devine**, Rutgers University, Sea-Level Rise and Third World Urban Coastal Hazards.

Discussant: **Douglas J. Sherman**, University of Southern California.

3090. Envir. Perception, Behavioral, Cultural Geo., Latin Am., Native Am. Specialty Groups and IGU Comm on the World Political Map: Americanite/Americanness/Americanidad European and Native Indian Roots On American Identity: Symbolic Transformations. Civic Ballroom.

Organizers: **Anne Buttimer**, University of Ottawa, **Vincent Berdoulay**, University of Ottawa

Chair: **Vincent Berdoulay**, University of Ottawa

12:55 **Martyn J. Bowden**, Clark University, The Invention of American Tradition;

1:15 **Luc Bureau**, University Laval, Celestial Archetypes of the Territory of Canada;

1:35 **Paul Kariya**, Dept. of Indian Affairs & Northern Development, The Making of a Euro-Canadian Identity Among Indians on the Northwest Coast.

3091. AAG Archives and Association History Committee: Geographic Thought in the U.S. and Canada: 100 years of Academic Intercourse. City Hall.

Organizer: **Martin S. Kenzer**, University of Southern California

Chair: **Martin S. Kenzer**, University of Southern California

12:55 **O.F.G. Sitwell**, University of Alberta, Can Geographers in the USA and Canada Contribute to Peace? One Suggestion in the Past; One Challenge for the Present;

1:15 **L.T. Guelke**, University of Waterloo, A.H. Clark and the Idea of Historical Geography;

1:35 **Courtice G. Rose**, Bishop's University, The Graduate School of Geography at Clark and its Influence on Canadian Geography Programmes.

Discussant: **Allen D. Bushong**, University of South Carolina.

3092. Geomorphology Specialty Group: Fluvial Processes I. Conference B.

Organizer: **Stanley W. Trimble**, University of Chicago

Chair: **Richard W. Reeves**, University of Arizona

12:55 **William L. Graf**, Arizona State University, Plutonium Storage and Floodplain Evolution, Northern Rio Grande, New Mexico;

1:15 **James C. Knox**, University of Wisconsin, Madison, The Downstream Variation in Lead and Zinc in Overbank Sediment;

1:35 **Bruce L. Rhoads**, University of Illinois, Impact of Channelization on the Fluvial Dynamics of a Dryland River;

1:55 **Stanley W. Trimble**, University of Chicago, Damage to Streambanks from Cattle — A Controlled Experiment;

2:15 **Frank H. Weirich**, University of Iowa, Fire Related Fluvial Erosion, Transport and Deposition Processes.

3093. Value Added Through Experiential Education. Conference C.

Organizer: **Roberta A. Smilnak**, Metropolitan State College

Chairs: **Roberta A. Smilnak**, Metropolitan State College, **Elaine F. Bosowski**, Villanova University

John R. Kilcoyne, Metropolitan State College;

Elaine F. Bosowski, Villanova University;

Robert W. Morrill, Virginia Polytechnic Institute & State University;

Roberta A. Smilnak, Metropolitan State College.

3094. Hazards Specialty Group: Canada/United States Transboundary Hazards: Research and Management Perspectives. Conference D.

Organizer: **Sarah Michaels**, University of Colorado

Chair: **Rutherford H. Platt**, University of Massachusetts at Amherst

12:55 **Roger Needham**, University of Ottawa, Coastal Zone Management:Media Myths and Truths;

1:15 **Sarah Michaels**, University of Colorado, Earthquake Information Exchange in British Columbia and Washington State;

1:35 **J.C. Day**, Simon Fraser University, **Sandra P. Tippett**, Simon Fraser University, Transnational Water Quality Management in the Strait of Georgia, British Columbia, and Puget Sound, Washington State;

1:55 **Mark N. Law**, Ontario Ministry of Natural Resources, **D.E. Coleman**, Environment Canada, **F.J. Horvath**, Michigan Department of Natural Resources, The Development of a Great Lakes Coastal Zone Data Base and its Application in Hazard Shoreline Management;

2:15 **Allen L. White**, Clark University, Trading Toxics: Issues in the Transboundary Movement of Hazardous Wastes Between the US and Canada.

3095. National Science Foundation Geography and Regional Science Program: Open Session on Proposal Preparation and Program Operation of the NSF Geography and Regional Science Program in the USA I. Spin Drift (4th floor)

Organizer: **Thomas J. Baerwald**, NSF

Chair: **Thomas J. Baerwald**, NSF

3096. Climate and Water Resources Specialty Groups: Regional Perspectives on an Emerging Global Hydrology I: North American Continent. Conference F.

Organizers: **David A. Howarth**, University of Louisville, **Katherine K. Hirschboeck**, Louisiana State University

Chair: **Katherine K. Hirschboeck**, Louisiana State University

12:55 Ming-ko Woo, McMaster University, **Peter Waylen**, University of Florida, Climate Change, Snow, Ice and Freeze Related Variables;
1:15 Michael J. Keables, University of Denver, Hydroclimatic Variability on the Great Plains;
1:35 Richard Marston, University of Wyoming, **Larry Pochop**, University of Wyoming, **Greg Kerr**, University of Wyoming, **Dave Veryzer**, University of Wyoming, **Marjorie L. Varuska**, US Air Force Academy, Changes in Glacier Runoff in the Wind River Range, Wyoming;
1:55 Robert C. Balling Jr., Arizona State University, Box-Jenkins Modelling of Great Salt Lake Water Levels.

3097. Population Specialty Group: Issues in Comparative Research in International Migration. Conference G.
Organizer: **Ellen Percy Kraly**, Colgate University
Chair: **Ellen Percy Kraly**, Colgate University
12:55 John F. Long, US Bureau of the Census, **Edward T. Pryor**, Statistics Canada, Conducting Co-Operative Immigration Research: The United States-Canada Case;
1:15 Robert Warren, US Immigration & Naturalization Service, **Ellen Percy Kraly**, Colgate University, Social Demographic Characteristics of Long-Term Immigration to the United States: 1983-1986;
1:35 Karen A. Woodrow, Bureau of the Census, Estimating Unknown Immigration Flows with Current Population Surveys;
1:55 Lawrence Basem, University of Chicago, Trying to Get It Right: Dilemmas of Multi-Method, Multi-Level, Multi-Disciplinary, Bi-National Research on International Migration of Mexico & the US.

3098. Mathematical Models and Quantitative Methods and GIS Specialty Groups: Morphogenetic Theories I: Fractals in Geography. Grand Ballroom West, Section Z.
Organizers: **Michel Phipps**, University of Ottawa, **Alain P. Roy**, University of Ottawa
Chair: **Michel Phipps**, University of Ottawa
12:55 Ling Bian, University of North Carolina, Chapel Hill, Fractal Dimension and Areal Units Compatibility of GIS Database;
1:15 Andre G. Roy, Universite de Montreal, **Ginette Gravel**, Universite de Montreal, **Andre Robert**, Universite de Montreal, Optimal Representation of Geographical Phenomena by Rectangular Grids;
1:35 Nina Siu-Ngan Lam, Louisiana State University, **Hong-lie Qiu**, Louisiana State University, An Analysis of Cancer Mortality Patterns in China Using Fractals;
1:55 Sandra L. Arlinghaus, Institute of Mathematical Geography, Central Place Fractals;
2:15 Paul A. Longley, University of Wales, Cardiff, **Michael Batty**, University of Wales, Cardiff, Urban Morphologies in Nearly-Three Dimensions: Extensions to Diffusion-Limited Aggregation.

3099. Education: Computers in Teaching. Grand Ballroom Centre.
Chair: **Douglas J. Wheeler**, Michigan State University
12:55 Robert Werner, Mankato State University, Educational Computing in Geography;
1:15 Robert Nunley, University of Kansas, **George Ulbrick**, University of Kansas, **Robert Wood**, University of Kansas, Hypermedia, Automated Mapping, and Spreadsheets as Microcomputer Tools for Geographic Literacy;
1:35 Douglas J. Wheeler, Michigan State University, Using GIS to Illustrate Basic Concepts of Scientific Modeling;
1:55 Sean Hartnett, University of Wisconsin, Eau Claire, Low Budget Shortcuts to High Technology: Some Applications of Macintosh Computers for Undergraduate Cartographic Instruction;
2:15 Susan M. Elshaw-Thrall, Lake City Community College, Simulated Urban Land Use (SULU): A Computer Assisted Decision Strategy.

3100. GIS: Methodological Issues. VIP Room.
Chair: **Alan M. Baker**, University of Toronto
12:55 Daniel F. Wagner, The Ohio State University, Performance Evaluation of Polygon Processing in Vector Based GIS;
1:15 Hsueh-cheng Chou, State University of New York at Buffalo, Using Roots Digitizing Program to Produce Data Needed for Location-Allocation Modeling;
1:35 Yee Leung, The Chinese University of Hong Kong, Improving the Intelligence of Geographical Information Systems by Expert System Technology;
1:55 Irina Vasiliev, Syracuse University, Examples of the Cartographic Treatment of Time as a Variable;
2:15 Konrad Dramowicz, College of Geographic Sciences, How to Merge Fire with Water: GIS and Perceptional Geography.

3101. Foreign Direct Investment. Kent.
Chair: **Alan MacPherson**, University at Buffalo
12:55 Fiona M. Davidson, University of Nebraska-Lincoln, Trends in US Foreign Direct Investment in Producer Services;
1:15 Rod B. McNaughton, The University of Lethbridge, US Foreign Direct Investment in Canada;
1:35 Claire Ellen Pavlik, University of Minnesota, International Investment and Sectoral Shifts of Three German Steel Corporations;
1:55 Neil Reid, Arizona State University, Japanese Direct Investment in the United States' Manufacturing Sector;
2:15 Ann M. Oberhauser, University of Toledo, Labor and the International Transfer of Japanese Work Organization.

3102. High Technology and Regional Development. Dufferin.
Chair: **John Holmes**, Queen's University
12:55 David Gibbs, Manchester Polytechnic, Venture Capital, High Technology Industry and Regional Development;
1:15 Susan L. Bradbury, Southwest Missouri State University, Professional Labor Markets and R&D Facility Location: The Effect of City Size;
1:35 Tim J. Sturgeon, University of California, Berkeley, **Richard A. Walker**, University of California, Berkeley, Urbanization in Silicon Valley, 1980-1987;
1:55 Noriyuki Sugiura, Keio University, Locational Implications of "IT"-Based Production Processes: A Case of Japanese Precision Machinery Industry.

3103. Climate: Energy Balance. Dominion South.
Chair: **Brian Hanson**, University of Delaware
12:55 Lin Wu, University of California, Los Angeles, Simulation of Energy Budgets on Different Urban Land Uses;
1:15 Ian R. Saunders, Simon Fraser University, **W.G. Bailey**, Simon Fraser University, Surface Energy Flux Estimation in an Alpine Tundra Environment;
1:35 Scott Kirsch, Memphis State University, Characterization of Potential Evapotranspiration Patterns In Illinois;
1:55 Gregory E. Faiers, University of Pittsburgh-Johnstown, Interannual Variability of Moisture and Aridity Indices in Northwest Ohio.

3104. Remote Sensing Specialty Group: Vegetation Assessment Through the Use of Remotely Sensed Data. Kenora.
Organizer: **Jeffrey A. Olsenholler**, University of Maryland
Chair: **Samuel N. Goward**, University of Maryland
12:55 Wayne P. Dulaney, University of Maryland, Evaluation of Radiometric and Micrometeorological Input Parameters for Evapotranspirational Modeling;
1:10 Jeffrey A. Olsenholler, University of Maryland, Relationships Between NDVI and Climate in the Oregon Transect;

1:25 **Jingli Yang**, University of Maryland, Extrapolation of Mean Monthly Climate Data in Mountainous Terrain of Western North America;

1:40 **Dennis Dye**, University of Maryland, **Samuel N. Goward**, University of Maryland, **Thomas Eck**, Space Applications Research, Inc., Global Patterns of Incident Photosynthetically Active Radiation Evaluated with the Total Ozone Mapping Spectrometer;

1:55 **Theresa Mulhern**, University of Maryland, Coastal Zone Color Scanner: Observations of Subarctic North America;

2:10 **Charles L. Walthall**, University of Maryland, **Theresa Mulhern**, University of Maryland, Simulation of Coastal Zone Color Scanner Subarctic Landscape Observations.

3105. Dryland Geomorphology and Human Adaptation. Peel.

Chair: **James F. Petersen**, Southwest Texas State University

12:55 **M. Justin Wilkinson**, Lockheed Engineering & Sciences Company, Landscapes and Sedimentation in Shield Deserts;

1:15 **Bill Schwarz**, University of Iowa, Sediment Characteristics of Abandoned Alluvial Channels;

1:35 **Wayne N. Engstrom**, California State University, Fullerton, A Cluster Analysis of Desert Mountain Drainage Basins;

1:55 **Dale Lightfoot**, University of Colorado, Boulder, **Frank Eddy**, University of Colorado, Boulder, The Prehistoric Pebble-Mulched Fields of the Galisteo Anasazi: An Agricultural Adaptation to Environment;

2:15 **James F. Petersen**, Southwest Texas State University, Weathering Depressions on a 19th Century Grave Stone: Valid Indicators for Rates of Granitic Decomposition?

3106. Religion and Geography: Diverse Patterns. Oxford.

Organizer: **Carolyn V. Prorok**, Slippery Rock University

Chair: **Carolyn V. Prorok**, Slippery Rock University

12:55 **Linda K. Fischer**, Richard Bland College/College of William and Mary, The German Debate About Geography and Religion;

1:10 **Gisbert Rinschede**, Katholische Universitat Eichstatt, Catholic Pilgrimage Centers in Quebec, Canada;

1:25 **Mary Lee Nolan**, Oregon State University, Christian Pilgrimage Traditions in India;

1:40 **Carolyn V. Prorok**, Slippery Rock University, Mohammad Hemmasi, University of North Dakota, Spatial Imprints of Islam on the Landscape of Trinidad;

1:55 **Allan Gleason**, (Retired), The St Clair River as a Religious Boundary;

2:10 **Robert H. Stoddard**, University of Nebraska-Lincoln, Patterns of Religion in Sri Lanka.

Discussant: **Carolyn V. Prorok**, Slippery Rock University.

1:30 pm to 3:30 pm

3107. Field Trip 16B: Teacher Field Trips: Towers and View.

Organizer: **Lorraine Clarkson**, Toronto Urban Studies Centre/Board of Education

1:30 pm to 5:30 pm

3108. Field Trip 14: Social Housing in Toronto.

Organizer: **John Hitchcock**, University of Toronto

2:00 pm to 6:00 pm

3109. Field Trip 15: The Western Inner City.

Organizer: **James Lemon**, University of Toronto

2:50 pm to 4:30 pm

3110. Environment: Air Pollution in the U. S. Cinema I.

Chair: **Jasper L. Harris**, North Carolina Central University

2:50 **Jane Zhen Feng**, University of Delaware, The Impact of Climate Upon Variation in Air Pollution Using a Synoptic Climatological Approach;

3:10 **Steve Ladochy**, California State University, Los Angeles, Particulate Air Pollution Patterns Over Metropolitan Los Angeles;

3:30 **Jasper L. Harris**, North Carolina Central University, **Harris E. Williams**, North Carolina Central University, Atmospheric Chemistry Trends in Raleigh/Durham;

3:50 **Walter Martin**, University of North Carolina-Charlotte, Meteorological Conditions Associated with Poor Air Quality in Charlotte, North Carolina;

4:10 **Martha Rogovin**, Boston University, **Chi-Ho Sham**, Boston University, A Temporal Analysis of Ozone Concentration in New England.

3111. Historical Geography and Canadian Geography Specialty Groups: Interpreting North America: The Canadian Archipelago and the Borderlands Thesis. Dominion South.

Organizer: **Cathy E. Kindquist**, University of British Columbia

Chair: **Deryck W. Holdsworth**, Pennsylvania State University

2:50 **R. Cole Harris**, University of British Columbia, The Canadian Archipelago and the Borderland Thesis;

3:10 **Victor Konrad**, University of Maine, Borderlands: A Concept for Reinterpreting North America.

3112. Canada and Water Resources Specialty Groups: U.S./Canada Boundary Waters: Current and Future Resource Issues. York.

Organizers: **Peter H. Meserve**, Northwest Missouri State University, **Gerald E. Galloway**, United States Military Academy

Chair: **Peter H. Meserve**, Northwest Missouri State University

2:50 **Keith W. Muckleston**, Oregon State University, Feasibility of Canadian Storage for Salmonid Restoration in the US;

3:10 **A. P. Lino Grima**, University of Toronto, Managing a Share Resource: Resiliency Enhancing Options in Great Lakes Water Levels Management;

3:30 **Peter H. Meserve**, Northwest Missouri State University, Crossborder Environmental Management: The St. Croix Waterway;

3:50 **Robert Ramraj**, University of Wisconsin-Milwaukee, WRDA, 1986 - Opportunities for US-Canada Cooperative Research on the Great Lakes.

Discussant: **Olen P. Matthews**, Oklahoma State University.

3113. Mathematical Models and Quantitative Methods SG: Quantitative Retail Analysis. Grand Ballroom East.

Organizer: **A. Stewart Fotheringham**, State University of New York at Buffalo

Chair: **Daniel Griffith**, Syracuse University

2:50 **Laurence Moore**, University College of Swansea, The Calibration of Disaggregate Choice Models Using Ordinal Stated Preference Data: An Assessment with Examples from Retailing and Transportation;

3:10 **Jean-Claude Thill**, University of Georgia, Spatial Pricing with Nonconvex Transportation Schedules;

3:30 **Steven Reader**, McMaster University, Consumer Shopping Behaviour Modelling Using Scanner Panel Data;

3:50 **Fiona McNeill**, McMaster University, Intertemporal Time Dependencies in Longitudinal Consumer Panel Data.

3114. GIS Specialty Group: GIS and Geographic Modeling. Cinema II.

Organizer: **Timothy Nyerges**, University of Washington

Chair: **Timothy Nyerges**, University of Washington
Michael F. Goodchild, University of California-SB;
Jeffrey Osleeb, Hunter College;
Grant Ian Thrall, University of Florida-Gainesville;
Paul Densham, State University of New York- Buffalo;
Timothy Nyerges, University of Washington.

3115. 1990 Nystrom Award Session II. Spin Drift (4th floor)
Chair: **George P. Malanson**, University of Iowa
2:50 Gearold O. Tuathail, Virginia Polytechnic Institute, Critical Geopolitics: Re-Thinking the Geopolitical Tradition and the Problematic of Geography and International Affairs;
3:10 Herschel Stern, Mira Costa College, The Rationalization of Administrative Substate Regions;
3:30 Melissa Savage, National Center for Atmospheric Research, Human Influence and the Morphology of the Forest Landscape;
3:50 Richard D. Dunning, St. Olaf College, Responses of the Buffalo River, Wisconsin to Late-Quaternary Environmental Changes;
4:10 Jeffrey J. McDonnell, Universities Space Research Association, The Age, Origin and Pathway of Subsurface Stormflow.

3116. Contemporary Agriculture and Rural Land Use Specialty Group: Restructuring the Farm Business in a Larger Economy. Carlton.
Organizers: **Rebecca S. Roberts**, University of Iowa, **Michael J. Troughton**, University of Western Ontario
Chair: **Rebecca S. Roberts**, University of Iowa
2:50 Tom Johnston, Massey University, Subsumption and the Family Farm in New Zealand;
3:10 David Lighthall, University of Iowa, **Rebecca S. Roberts**, University of Iowa, The Development of Agrichemical Use Practices: Implications for Theory and Policy;
3:30 Michael J. Troughton, University of Western Ontario, An Ill-Considered Pact: The Canada-US Free Trade Agreement and the Agricultural Geography of North America;
3:50 Quentin P. Chiotti, University of Western Ontario, The Aftermath of the Free Trade Agreement.
Discussant: **Paul Frederic**, University of Maine-Farmington.

3117. Cartography Specialty Group: Cartography Student Honors Paper Competition. Oxford.
Organizer: **Jois Child**, Eastern Washington University
Chair: **Jois Child**, Eastern Washington University
2:50 Cynthia A. Brewer, Michigan State University, The Effect of Color on the Perception of Map Scale;
3:20 Rudolph P. Prosser, San Diego State University, Comparison of Elevation Values from Three Data Sources;
3:50 Changyong Cao, Louisiana State University, Displacement Error in Vector-Raster-Vector Conversion.

3118. Industrial Geography Specialty Group: Growth of the Service Sector I: The Macrogeography. Huron.
Organizers: **Andrew J. Krmenec**, Northern Illinois University, **Adrian Esparza**, Northern Illinois University
Chair: **Andrew J. Krmenec**, Northern Illinois University
2:50 Breandan O hUallachain, Arizona State University, The Changing Function of American Metropolitan Areas;
3:10 Andrew J. Krmenec, Northern Illinois University, **Adrian Esparza**, Northern Illinois University, Regional Differences in the Externalization of Producer-Services;
3:30 William B. Beyers, University of Washington, Changing Business Practices and the Growth of the Producer Services: Geographical Implications;
3:50 Alan MacPherson, University at Buffalo, **John Lombard**, State University of New York - Buffalo, **James W. Harrington**, University at Buffalo, Methodological Issues in Contemporary Producer Services Research: An Empirical and Conceptual Synthesis.
Discussant: **Donald W. Jones**, Oak Ridge National Lab.

3119. Coastal and Marine Geography & Geomorphology Specialty Groups: Coastal Forms and Process. Simcoe.
Organizers: **Bernard O. Bauer**, University of Southern California, **Paul A. Gares**, Colgate University
Chair: **Bernard O. Bauer**, University of Southern California
2:50 Patrick J. McKay, Western Washington University, **Thomas A. Terich**, Western Washington University, The Gravel Barriers of Washington's Pacific Coast;
3:10 Kathleen Anne Jagger, Rutgers University, **Norbert P. Psuty**, Rutgers University, **James R. Allen**, National Park Service, Spatial-Variations in Morphodynamic Relationships;
3:30 Robin Davidson-Arnott, University of Guelph, **A. Van Heyningen**, University of Guelph, **D. Armstrong**, University of Guelph, Morphodynamics and Sedimentology of Longshore Sandwaves;
3:50 Paul A. Gares, Colgate University, Predicting Erosion Along the East Coast of the United States.
Discussant: **H. Jesse Walker**, Louisiana State University.

3120. Environ. Perception, Behavioral, Cultural Geo., Latin Am., Native Am. Specialty Groups and IGU Comm on the World Political Map: Americanite/Americanness/Americanidad European and Native Indian Roots on Am. Identity: Territory, Reach & Identity. Civic Ballroom.
Organizers: **Anne Buttimer**, University of Ottawa, **Vincent Berdoulay**, University of Ottawa
Chair: **David B. Knight**, Carleton University
2:50 Andre Langlois, University of Ottawa, **Anne Gilbert**, University of Ottawa, Migration and the Transformation of Franco-Ontarian Identity;
3:10 William E. Doolittle, University of Texas, Latitudes and Attitudes: The Southern Limits of North America;
3:30 Nancy C. Doubleday, Inuit Circumpolar Conference-Ottawa, Arctic Worlds: At the Northern Limits of North America.

3121. AAG Archives and Association History Committee: Mr. Sauer - The Mentor and Disciples: Video as an Archival Thematic Medium I. City Hall.
Organizer: **Maynard Weston Dow**, Plymouth State College
Chair: **Maynard Weston Dow**, Plymouth State College
2:50 "Mr. Sauer" (60-minute video)
Discussant: **Maynard Weston Dow**, Plymouth State College.

3122. Geomorphology Specialty Group: Fluvial Processes II. Conference B.
Organizer: **Stanley W. Trimble**, University of Chicago
Chair: **Richard W. Reeves**, University of Arizona
2:50 Carol Harden, University of Tennessee, Differences in Runoff and Sediment Production within an Andean Watershed;
3:10 Allan James, University of South Carolina, Late Quaternary Stream Capture, Northern Sierra Nevada;
3:30 Frank Magilligan, Georgia State, Lateral and Vertical Sedimentological Variation During Floodplain Alluviation;
3:50 W. Andrew Marcus, University of Maryland, **Michael S. Kearney**, University of Maryland, Sediment Sources in the Upper South River Estuary, Maryland;
4:10 Andrew J. Miller, University of Maryland, Baltimore County, Flow Patterns, Valley Geometry, and Spatial Distribution of Flood-Generated Erosion Features.

3123. Soviet and East European Specialty Group: Geographical Dimensions of Perestroyka: II. Conference C.
Organizers: **Michael J. Bradshaw**, University of Birmingham,

Gary Hausladen, University of Nevada-Reno
Chair: **Michael J. Bradshaw**, University of Birmingham
2:50 **Gary Hausladen**, University of Nevada-Reno, Perestroyka and Resource Frontier Development;
3:10 **Brenton M. Barr**, University of Calgary, Industrial Restructuring and Environmental Management: The Case of the Forest;
3:30 **Robert N. North**, University of British Columbia, Perestroyka and the Soviet Transportation System.
Discussant: **George J. Demko**, Dartmouth College.

3124. China Geography Specialty Group: China I: Urbanization and Economic Development Strategies. Peel.
Organizer: **C.P. Lo**, University of Georgia
Chair: **C.P. Lo**, University of Georgia
2:50 **Kok Chiang Tan**, University of Guelph, China's New Spatial Approach to Economic Development;
3:10 **Yue-man Yeung**, Chinese University of Hong Kong, The Role of Chinese Coastal Cities Under Open Door Policy;
3:30 **Kam Wing Chan**, University of Hong Kong, City Growth in Post-1949 China: Spatial and Temporal Dimensions;
3:50 **Clifton W. Pannell**, University of Georgia, Evaluating Efficiency of Large Chinese Cities.

3125. Climate and Water Resources Specialty Groups: Regional Perspectives on an Emerging Global Hydrology II: North American Continent. Conference F.
Organizers: **David A. Howarth**, University of Louisville, **Katherine K. Hirschboeck**, Louisiana State University
Chair: **James T. Stephens**, University of North Carolina
2:50 **Anthony Orr Clarke**, University of Louisville, Rainfall Intensity, Tractive Competence, and Boulder Transport in Small, High Energy Desert Watersheds;
3:10 **Judy L. Hoff**, Louisiana State University, Water Balance Evaluation of the Mississippi River Flow Regime: 1932-1988;
3:30 **Gregory J. McCabe**, US Geological Survey, **L. E. Hay**, US Geological Survey, **D. M. Wolock**, US Geological Survey, **M. A. Ayers**, US Geological Survey, A Weather-Type Model of Temperature and Precipitation Under Doubled-CO$_2$;
3:50 **Dale A. White**, US Geological Survey, **R. Smith**, US Geological Survey, **Richard Alexander**, US Geological Survey, **Katherine Lins**, US Geological Survey, **C. Price**, US Geological Survey, **K. Robinson**, US Geological Survey, **S. Jenson**, US Geological Survey, Spatial Analysis of Statewide Water-Quality Data.

3126. Population Specialty Group: Economic Impacts of Recent U.S. Population Shifts. Conference G.
Organizer: **Richard Jones**, University of Texas at San Antonio
Chair: **Richard Jones**, University of Texas at San Antonio
2:50 **David A. Plane**, University of Arizona, **Peter Rogerson**, State University of New York at Buffalo, Tracking the Baby Boom, the Baby Bust, and the Baby Boom Echo: Impacts of Shifting Age Composition on US Geographic Mobility, Migration Patterns;
3:10 **Hazel A. Morrow-Jones**, The Ohio State University, Economic Impacts of the Changing Geography of Home Ownership in the U.S.;
3:30 **Andrew Isserman**, West Virginia University, Should There Be Spatial Immigration Policies in the United States?.
Discussant: **Richard Jones**, University of Texas at San Antonio.

3127. Mathematical Models and Quantitative Methods and GIS Specialty Groups: Morphogenetic Theories II: Cellular Automata in Geography. Grand Ballroom West, Section Z.
Organizers: **Michel Phipps**, University of Ottawa, **Alain P. Roy**, University of Ottawa
Chair: **Carl Amrhein**, University of Toronto
2:50 **Randy Gimblett**, University of Arizona, **Robert Itami**, University of Arizona, **James D. Clark**, University of Arizona, **George Ball**, University of Arizona, The Integrated Dynamic Ecological Analysis System: (c) A Framework for Modeling and Simulating Spatial Dynamics in Geographic Information Systems;
3:10 **George Ball**, University of Arizona, PROMAP (c): Cellular Automata in a GIS Framework;
3:30 **Alain P. Roy**, University of Ottawa, Deterministic Chaos in Geography: Specter of Our Limitations or Sign of Renewal in Science?;
3:50 **Michel Phipps**, University of Ottawa, From Neighborhood Coherence to Cellular Automata: Some Odd Bearing on Cancer Initiation;
4:10 **Lee DeCola**, US Geological Survey, Cellular Automata Models of Remote Sensing Imagery.

3128. Political Geography: Global and Geopolitical Issues. Grand Ballroom Centre.
Chair: **John C. Hudson**, Northwestern University
2:50 **John O'Loughlin**, University of Colorado, **Luc Anselin**, University of California, Santa Barbara, Definition and Measurement of Regional Contexts in International Relations;
3:10 **Simon Dalby**, Vancouver Community College, Rethinking European Geopolitics: The Discourses of Dealignment;
3:30 **Thomas D. Anderson**, Bowling Green State University, Comparison of Changes in Two Great Power Dominated Regions: Latin America and East Europe;
3:50 **Barry Riddell**, Queen's University, The Global Village Means the African World "Falls Apart" Again: Geographical Impact of Structural Adjustment;
4:10 **Richard Grant**, University of Colorado at Boulder, **Jan Nijman**, University of Colorado at Boulder, Global Restructuring, the United States, Japan and Foreign Aid.

3129. Biogeography: Vegetation Succession and Patch Dynamics. Grand Ballroom West, Section X.
Chair: **Susan W. Beatty**, University of Colorado
2:50 **David M. Sharpe**, Southern Illinois University at Carbondale, **Yang Zhao**, Southern Illinois University at Carbondale, Landscape Dynamics and Ecologic Implications in Land Between the Lakes, Kentucky-Tennessee;
3:10 **John A. Kupfer**, University of Iowa, Successional Processes in a Naturally Occurring Forest Edge;
3:30 **Kathleen M. Connolly**, University of California, Los Angeles, The Successional Status of Lake Katharine State Nature Preserve, Ohio;
3:50 **L. Edward Harvey**, University of California, Santa Barbara, Historical Recruitment of Blue Oak Populations in Southern California;
4:10 **Bryan D. Baker**, University of Minnesota, Interspersion of Habitat Elements and Animal Movement Modeling.

3130. Third World: Development Issues. Grand Ballroom West, Section Y.
Chair: **Christine Drake**, Old Dominion University
2:50 **Richard W. Perritt**, Auburn University, African River Basin Development: Achievements, the Role of Institutions, and Strategies for the Future;
3:10 **Carlos Quandt**, University of California, Los Angeles, **Rebecca Morales**, University of California, Los Angeles, The New Contenders: Developing Countries as Technological Innovators;
3:30 **Nalani Hennayake**, Syracuse University, The Myth of National Development;
3:50 **David Butz**, McMaster University, **Steve C. Lonergan**, University of Victoria, **B. Smit**, University of Guelph, Evaluating

the Impact of Development Upon Traditional Rural Community Sustainability;
4:10 Mohammed A. Ali, Sultan Qaboos University, Oman, The Urgent Need for GIS for Third World Developing Environment: Sultanate of Oman Experience.

3131. Urban Social Issues. Conference E.
Chair: **Susan Wiley Hardwick**, California State Univ-Chico
2:50 Janet E. Kodras, Florida State University, **John Paul Jones III**, University of Kentucky, Restructured Regions and Families: Poverty Feminization in the US;
3:10 Jenny Zorn, California State University, San Bernardino, The Effect of Context on Gender Wage Gaps;
3:30 Gilles Viaud, University of Saskatchewan, Social Stratification and Occupational Asymmetry of Double Income Families in Quebec City;
3:50 Stephen R. Higley, University of Illinois-Urbana, The Geography of the American Upper Class;
4:10 Bobby M. Wilson, University of Alabama at Birmingham, Corporate Mode of Production and Race in Birmingham, Alabama, 1907-1960.

3132. Transportation I. Norfolk.
Chair: **Ira M. Sheskin**, University of Miami
2:50 Ira M. Sheskin, University of Miami, Surveyed Behavioral Intent in Transit Usage;
3:10 Allaire C. Shaw, The Ohio State University, Household Interaction and Activity-Based Travel: Some Preliminary Results;
3:30 Gregory M. Flay, University of Minnesota, Access-Based Transport Analysis;
3:50 William R. Black, Indiana University, Spatial-Temporal Autocorrelation Analysis of Highway Accidents.

3133. Latin America: Agriculture and Land Use in Brazil and Amazonia. Elgin.
Chair: **Frank A. Erickson**, Kent State University
2:50 Brian Kent Long, Syracuse University, Conflicting Land-use Schemes in the Ecuadorian Oriente;
3:10 Lawrence A. Brown, Ohio State University, **Douglas Southgate**, Ohio State University, **Rodrigo Sierra**, Ohio State University, **James Lewandowski**, Ohio State University, Frontier Settlement in the Ecuador Amazon;
3:30 L. Michael Trapasso, Western Kentucky University, Deforestation of the Amazon: A Brazilian Perspective;
3:50 Roger A. Roberge, University of Ottawa, Labor Force Segmentation and the Intra Urban Location of Informal Sector Activity in Salvador, Brazil;
4:10 Keith D. Muller, West Chester University, Agricultural Mechanization and Rural Settlement in West Parana, South Brazil.

3134. Environmental Change: Global Perspectives. Wentworth.
Chair: **Jack Gentile**, James Madison University
2:50 Bryn Greer-Wootten, York University, Canadian Elite Responses to the Global Environmental Crisis;
3:10 Eran Feitelson, The Johns Hopkins University, Sharing the Globe: What is the Problem?;
3:30 John Lier, California State University-Hayward, Global Ecological Thought, Resource Management, and Environmental Ethics;
3:50 Charles L. MacCabe, University of Arizona, World Images and Conflict Resolution in the Global Village;
4:10 David M. Diggs, Natural Hazards Center, University of Colorado, Climate Change, Drought, and Perception: An Environmental Perception Approach to Understanding Response to Global Change.

3135. Biogeography: General I. Kenora.
Chair: **Lisa Graumlich**, University of Arizona
2:50 Katherine J. Hansen-Bristow, Montana State University, **William K. Wyckoff**, Montana State University, **Jeff Banfield**, Montana State University, Magnitude, Timing, and Cause of Change within a Forest Ecotone;
3:10 Kenneth A. Barrick, University of Alaska, Nutrient Variation of Subalpine Tree Species in the Colorado Front Range;
3:30 A-Xing Zhu, University of Toronto, **Art Limbird**, University of Calgary, A Quantitative Measure of White Spruce - Soil Texture Relations in the Drumheller Area;
3:50 Sheridan L. Dodge, Georgia State University, The Vegetation Tension Zone Across Lower Michigan's Thumb Area;
4:10 Mary R. Craig, University of Iowa, Drought Related Riparian Forest Colonization on Point Bars.

3136. Medical: Environment of Risk: Third World. Kent.
Chair: **Frank Innes**, University of Windsor
2:50 Melinda Meade, University of North Carolina-Chapel Hill, **Wilbert M. Gesler**, University of North Carolina-Chapel Hill, Comparing Specific Environments of Risk Using GIS;
3:10 Terrianne Lavin, University of Delaware, Climatic Controls Governing Dengue-Transmitting Populations of Aedes Aegypti in Puerto Rico;
3:30 Michael H. Vachon, University of Texas, Some Observations Concerning the Distribution of Onchocerciasis in Southern Mexico;
3:50 Janie Webster Leech, San Francisco State University, The Distribution of Glucose-6-Phosphate Dehydrogenase (G6PD) Deficiency in Sardinia with Reference to Favism;
4:10 Chandra C. Khan, Kent State University, Milton E. Harvey, Kent State University, Child Nutrition and Public Policy Options: A Case Study of Mexican American Children.

3137. Regional Planning Perspectives. Dufferin.
Chair: **Ray Bromley**, State University of New York at Albany
2:50 Christopher H. Exline, University of Nevada, Mandated Regional Planning: A Case Study;
3:10 Robert A. Young, California State University, Fullerton, Redevelopment in a Competitive Growth Region;
3:30 Bradley J. Clay, Ohio State University, Regional Patterns in Occupational Structure: Is Control Decentralizing in the US?;
3:50 Rowena Ahern, University of Washington, Organizational and Regional Aspects of Asymmetries in Strategic Alliances;
4:10 Juergen Ossenbruegge, University of Hamburg, Impacts of Environmental Policies on Regional Restructuring in Industrialized Societies: The Case of Hamburg Metropolitan Area.

3138. Climate: Precipitation Frequency and Variability. Conference D.
Chair: **Sue Grimmond**, Indiana University
2:50 Laura Haston, University of California, Santa Barbara, **Joel Michaelsen**, University of California, Santa Barbara, Spatial and Temporal Variability in Precipitation Over Western North America;
3:10 Carmen Maso, University of Oklahoma, Diurnal Variation in Precipitation Frequency Over the Central Plains of the United States;
3:30 Barry D. Keim, Louisiana State University, Frequency and Magnitude of Immense Rainstorms in New Orleans;
3:50 David R. Legates, University of Oklahoma, An Evaluation of Procedures to Estimate Monthly Precipitation Frequencies;
4:10 Alan Basist, National Weather Service, Precipitation Patterns Across the Norwegian Fiords and Central Highlands.

3139. New Models in Geography I. Dominion North.
Organizers: **Richard Peet**, Clark University, **Nigel Thrift**, University of Bristol

Chair: **Richard Peet**, Clark University

2:50 **Richard Peet**, Clark University, **Nigel Thrift**, University of Bristol, Political Economy and Human Geography;

3:10 **Jacque Emel**, Clark University, Re-Theorizing Human-Environment Relations;

3:30 **Paul Cloke**, St. Davids University College, Rural Geography and Political Economy;

3:50 **Edward W. Soja**, University of California-Los Angeles, Postmodern Geographies and the Critique of Historicism.

Discussant: **Allan Pred**, University of California at Berkeley.

3140. Field Experience in the Training of a Geographer: Role, Form and Status. VIP Room.

Organizers: **Douglas Heffington**, University of Oklahoma, **T.H. Lee Williams**, University of Oklahoma

Chair: **Douglas Heffington**, University of Oklahoma

William T. Elberty Jr., St. Lawrence University;

Sam Hilliard, Louisiana State University;

William C. Johnson, University of Kansas;

O. Orland Maxfield, University of Arkansas;

Robert A. Rundstrom, George Mason University;

T.H. Lee Williams, University of Oklahoma.

3141. Gender and Labor Markets. Windsor East.

Chair: **Lata Chatterjee**, Boston University

2:50 **T.R. Lakshmanan**, Boston University, **Patrick Buckley**, Western Washington University, **Y. Liang**, Boston University, Patterns of US Female Market Work in an Era of Economic Restructuring;

3:10 **Jo Little**, Bristol Polytechnic, Women and the Rural Labour Market: The Impact of Restructuring on Women's Employment Opportunities in Rural Areas;

3:30 **Pamela Moss**, McMaster University, Gender Formation in Waged Labour Processes;

3:50 **Valerie Preston**, York University, **Glenda Laws**, Pennsylvania State University, Ethnicity, Gender and Urban Labor Markets;

4:10 Lata Chatterjee, Boston University, Spatial Distribution of Female Workers in High Tech Industries in Massachusetts.

3142. Applied Geography Specialty Group: Young Scholars in Applied Geography. Windsor West.

Organizer: **John P. Wilson**, Montana State University

Chair: **Bill Leon**, University of Colorado, Colorado Springs

2:50 **Marylou Burkard**, Wilfrid Laurier University, Bed Load Measurements of the Nottawasaga River, Ontario and Selected Tributaries;

3:10 **Paul G. DiRezze**, Ryerson Polytechnical Institute, Retail Trade Area Sensitivity Analysis at the Regional Level: A Case in Welland Ontario;

3:30 **Gallya T. Glawson**, State University of New York, Binghamton, The Effect of Land-Use Changes on Rainfall-Runoff Ratio in the Schoharie Creek Watershed;

3:50 **Thomas E. Herman**, State University of New York, Binghamton, Modeling Grocery Store Potential Sales: Behavioral and Non-Behavioral Approaches;

4:10 **James C. Saku**, Wilfrid Laurier University, Drought and Famine in Africa: Humanistic or Natural?

2:50 pm to 5:00 pm

3143. Poster Session: Urban, Economic, Planning, Agriculture, Land Use, Recreation, Hazards. Sheraton Hall.

Robert C. Larson, Indiana State University, **Walter H. Carnahan**, Indiana State University, Population Density as a Determinant of Urban Radiant Temperatures;

Everett G. Smith Jr., University of Oregon, This Century of Cities;

Brady Foust, University of Wisconsin-Eau Claire, **Howard Botts**, University of Wisconsin-Whitewater, Business Structure and Highway Accessibility as Measured by "ES202" Data for Wisconsin Small Towns;

Sharon Corkill Cobb, James Madison University, Neighborhood Participation and Quality of Life in Harrisonburg, Virginia;

James L. Davis, Western Kentucky University, Highway and Street Transportation Facilities Analysis of Warren County, Kentucky;

Kenneth B. Beesley, Trent University, Satisfaction with Life and Community: City-Suburban Variations in Metropolitan Toronto;

David S. Ellenwood, Simon Fraser University, **John T. Pierce**, Simon Fraser University, Spatial Aspects of Population Growth Characteristics and Demographic Change in the Lower Mainland of British Columbia, Canada-1971-2006;

Henry W. Bullamore, Frostburg State University, Small Town Planning Practice in the United States and Canada;

Philip Shea, East Carolina University, **Jannis B. Shea**, East Carolina University, The Middle Atlantic Area's Continuing Care Retirement Villages;

Richard A. Walasek, University of Wisconsin-Parkside, Comparisons of Residential Natural Gas and Electricity Prices;

Howard Botts, University of Wisconsin-Whitewater, Locational Changes in Canadian Manufacturing: 1977-1983;

John T. Bowen Jr., University of Kentucky, Progress in Appalachia? Unemployment in Appalachian Labor Markets 1966-1989;

James M. Rubenstein, Miami University, Integration of Canadian and US Automotive Industries;

Bob Sharpe, Wilfrid Laurier University, Spatial Aspects of Part-time Employment and Self-employment in Canada;

Ray Lougeay, State University of New York-Geneseo, **Katina Pappas**, State University of New York-Geneseo, **Jon Bathgate**, State University of New York-Geneseo, Factors Affecting Patterns of Personal Assault;

Christine M. Rodrigue, California State University, Chico, **Virginia L. Oliver**, Area Location Systems, Spatial Analysis of a Financial Merger;

William C. Rense, Shippensburg University, Trekking in Nepal: Impact on the Khumbu and Kangchenjunga Areas;

Cheryl Walley Lougeay, State University of New York-Geneseo, Current and Potential Management Patterns in New Zealand Natural Landscape Reserves;

Richard V. Smith, Miami University, Leisure Activities and the Geography of an Area: Selected Examples;

Donald J. Voeller, University of Wisconsin-Whitewater, **Brady Foust**, University of Wisconsin-Eau Claire, **Howard Botts**, University of Wisconsin-Whitewater, Tourism and Resource-Based Recreation in Wisconsin;

Jane L. Craig, University of Akron, Land Use Problems Associated with Organic Soils;

Jennifer L. DeHart, Appalachian State University, **Thomas Ross**, Pembroke State University, Land Use in the Carolina Bays;

Katherine J. Miller, University of Toronto, Access Roads in Seasonally Dry Tropical Forest, Yucatan;

Roni Gordon, University of California-Los Angeles, After the Big One: Water, Water Everywhere..But Nowhere;

Burrell E. Montz, State University of New York at Binghamton, A Comparison of Land Value Changes in Four Communities with

Different Flood Histories;
H. Daniel Stillwell, Appalachian State University, Snow Avalanche Hazard Along Mountain Roads: A Comparative Study;
Otis W. Templer, Texas Tech University, The Texas High Plains Wine Growing Industry;
Jerry A. Hall, Wilfrid Laurier University, A Reassessment of Mennonite Agriculture in Belize Central America.

4:45 pm to 6:25 pm

3144. Minorities, Poverty and Health. VIP Room.
Organizer: **Dona Schneider**, Rutgers University
Chair: **Dona Schneider**, Rutgers University
4:45 Olivia Mitchell-Morris, Rutgers University, Marketing to the African-American Consumer: Selling Smoke;
5:05 Michael Greenberg, Rutgers University, Quantity and Quality of Data Available to Study Minority Cancer;
5:25 Jean Pierre Thouez, Universite de Montreal, Obesity and Hypertension Among the Inuit and Cree of Northern Quebec;
5:45 Gerard Salem, University of Montreal-ORSTOM, **Bernard Maire**, ORSTOM, Urbanisation and Nutritional Status in an African Suburb: Pikine (Senegal).
Discussant: **Wilbert M. Gesler**, University of North Carolina-Chapel Hill.

3145. Socio-Political: Geography of Institutions. Grand Ballroom West, Section X.
Chair: **J. Clark Archer**, University of Nebraska-Lincoln
4:45 Joel Quam, Indiana University, The Negative Externalities of Prisons;
5:05 Paul Sanford Salter, Washburn University, Brown vs. School Board of Topeka, Kansas: Geographic Analysis of Brown III;
5:25 Kathleen Molnar Brown, GeoSpectra Corporation, Modelling Catholic Parish Consolidation: A Location-Allocation Solution;
5:45 Eric A. Anderson, University of Minnesota, The CBC: An Institutional Geography;
6:05 Joe Painter, Open University, Geography of Trade Union Responses to Changing UK Local Government.

3146. Tourism Research in Canada. Oxford.
Organizer: **Peter E. Murphy**, University of Victoria
Chair: **Peter E. Murphy**, University of Victoria
4:45 C. Peter Keller, University of Victoria, **Richard W. Butler**, University of Western Ontario, Mapping for Tourism: Past, Present, Future;
5:05 David B. Weaver, University of Regina, Caribbean Tourism Trends;
5:25 Winston Husbands, Ryerson Polytechnical Institute, A Country Without People: Visitors' Expectations of Zambia;
5:45 Peter E. Murphy, University of Victoria, Seasonal and Spatial Patterns of Regional Tourism on Vancouver Island, B.C.

3147. Contemporary Agriculture and Rural Land Use and Rural Development Specialty Groups: Restructuring the Relationship Between Natural Resource Development and the Environment. Carlton.
Organizers: **M. Duane Nellis**, Kansas State University, **Paul Frederic**, University of Maine-Farmington, **Darrell Napton**, Southwest Texas State University
Chair: **Owen J. Furuseth**, University of North Carolina-Charlotte
4:45 M. Duane Nellis, Kansas State University, Restructuring the Relationship Between Rural Land Use Development and the Environment;
5:05 James R. Pease, Oregon State University, Resource Use and Environmental Policy: Oregon Initiatives for the Nineties;
5:25 Rebecca S. Roberts, University of Iowa, **Jacque Emel**, Clark University, Groundwater Management Institutions in the Southern Ogallala Aquifer: Effects on Irrigated Land Use;
5:45 Robert J. Mason, Temple University, Greenline Parks: Land-Use Conflicts in Exurbia.

3148. Urban Geography Specialty Group: The Urban "Underclass": Forum. Conference E.
Organizers: **Eric Sheppard**, University of Minnesota, **John Mercer**, University of Victoria
Chair: **John Mercer**, University of Victoria
Eric Sheppard, University of Minnesota;
John Mercer, University of Victoria.

3149. Socialist Geography and Geographic Perspectives on Women Specialty Groups: Gender, Class and Organizing: Putting Progressive Politics into Practice. Windsor East.
Organizers: **Leyla Vural**, Rutgers University, **Melissa Gilbert**, Clark University
Chair: **Leyla Vural**, Rutgers University
4:45 Susana Fried, Rutgers University, Gender and Urban Transformation: Organizing Neighborhood Women;
5:05 Alan Paul, University of California - Los Angeles, **Rika Uto**, University of California - Los Angeles, Interpretive Communities in Santa Monica: Organizing the People's Republic;
5:25 Leyla Vural, Rutgers University, "Knowledge is Power": Fannia Cohn and Workers' Education, 1917-1935;
5:45 Melissa Gilbert, Clark University, Radical Forms of Bureaucracy? Women Organizing in the Transport and General Worker's Union;
6:05 P.A. Crang, Cambridge University, It's Showtime: Notes on the Social Situation of Waiting.

3150. Energy and Environment Specialty Group: Global Warming and Infrastructure Issues. Wentworth.
Organizer: **Susan Macey**, Southwest Texas State University
Chair: **Susan Macey**, Southwest Texas State University
4:45 L.D. Danny Harvey, University of Toronto, The Potential Role of Hydrogen Fuel in Alleviating the Buildup of Greenhouse Gases;
5:05 Edward L. Hillsman, Oak Ridge National Laboratory, **Frank Southworth**, Oak Ridge National Laboratory, Opportunities and Constraints to Reduce CO_2 Emissions from Transportation;
5:25 Steve C. Lonergan, University of Victoria, **Ming-ko Woo**, McMaster University, **Rick Difrancesco**, McMaster University, Assessing the Economic Impacts of Climate Warming on the Canadian Arctic;
5:45 Ted R. Miller, The Urban Institute, **J. Christopher Walker**, The Urban Institute, **G. Thomas Kingsley**, The Urban Institute, **William A. Hyman**, The Urban Institute, Global Climate Change: A Challenge to Infrastructure Planners.
Discussant: **Diana M. Liverman**, Pennsylvania State University.

3151. Remote Sensing Specialty Group: Remote Sensing - Sensor and Resource Analysis. Kenora.
Organizer: **Vincent G. Ambrosia**, NASA-Ames Research Center
Chair: **Vincent G. Ambrosia**, NASA-Ames Research Center
4:45 Michael Timothy Fitzgerald, San Francisco State University, **Jeff Myers**, ATAC, NASA/Ames, Vegetation Stress Detection Using a Day/Night TM Simulator Data Set;
5:05 John R. Jensen, University of South Carolina, **R. Ramsey**, University of South Carolina, **H. Lin**, University of South Carolina, **X. Yang**, University of South Carolina, **B. Davis**, NASA John Stennis Space Center, **J. Michel**, RPI International, Inc., Remote Sensing of the Mangrove Component for Coastal

Environmental Sensitivity Index Mapping;
5:25 Vincent G. Ambrosia, NASA-Ames Research Center, **James A. Brass**, NASA-Ames Research Center, **Richard Lathrop**, Rutgers University, **K. Hibbard**, NASA-Ames Research Center, **Philip Riggan**, USDA-Forest Service, The Yellowstone Fire One Year Later—Research in Remote Sensing Analysis;
5:45 Thomas K. Rudel, Cook College, Rutgers University, Shuar and Colono Deforestation in the Ecuadorian Amazon: A Remote Sensing Analysis;
6:05 Kenneth J. Langran, University of Nebraska-Omaha, **John F. Shroder Jr.**, University of Nebraska-Omaha, Using Remote Sensing to Monitor the Decline of Karez Agriculture in Zamin Dawar.

3152. Industrial Geography Specialty Group: Growth of the Service Sector II: Firm-Level Geography. Huron.
Organizers: **Andrew J. Krmenec**, Northern Illinois University, **Adrian Esparza**, Northern Illinois University
Chair: **Adrian Esparza**, Northern Illinois University
4:45 James O. Wheeler, University of Georgia, New York's Corporate Linkages within the United States Metropolitan Hierarchy;
5:05 Milford B. Green, University of Western Ontario, Patterns of Venture Capital Investment in the United States: 1970-1988;
5:25 Brian P. Holly, Kent State University, **Audrey E. Clarke**, Kent State University, Service Industry Deregulation: The Case of Commercial Banking in Ohio;
5:45 H. Ernste, Swiss Federal Institute of Technology, Corporate Restructuring and Regional Policy in Switzerland.
Discussant: **Geoffrey J. D. Hewings**, University of Illinois.

3153. Historical Geography: An Oklahoma Tradition. Kent.
Organizer: **Lawrence E. Estaville Jr.**, Clemson University
Chair: **Lawrence E. Estaville Jr.**, Clemson University
4:45 Jerry Gerlach, Winona State University, The Prohibition Tavern: A Nebraska Study;
5:05 John M. Caldwell, University of Oklahoma, Reforming the Continent: The Methodist Organization of America, 1784-1844;
5:25 Robert R. McKay, Clarion University, Mexican Repatriation from El Paso During the Great Depression;
5:45 Brock J. Brown, University of Colorado at Boulder, Evolution of Push Factors Contributing to Out-Migration from El Cerrito, New Mexico;
6:05 Lawrence E. Estaville Jr., Clemson University, Perceptions of the Cajuns and Their Homeland: Realities or Myths?

3154. Coastal and Marine Geography and Geomorpholoy: Sediment Transport in Coastal Systems. Simcoe.
Organizers: **Bernard O. Bauer**, University of Southern California, **Paul A. Gares**, Colgate University
Chair: **Bernard O. Bauer**, University of Southern California
4:45 Jason Michael Woodruff, University of Hull, **J. Hardisty**, University of Hull, Experiment on Bedload Transport in Asymmetric Oscillatory Flows;
5:05 Brian Greenwood, University of Toronto, Nearshore Sediment Transport and Morphodynamics: Methodology of the C-Coast Programme;
5:25 Philip D. Osborne, University of Toronto, **Brian Greenwood**, University of Toronto, Cross-Shore Suspended Sediment Transport: The Role of Wind Waves, Infragravity Waves and Mean Flows;
5:45 Nurith Sela, University of Toronto, **Brian Greenwood**, University of Toronto, Alongshore Sediment Transport: An Empirical Test of Existing Models.
Discussant: **James R. Allen**, National Park Service.

3155. Asian Geography and the Regional Development and Planning Specialty Groups: Asian Planning and Development Issues. Dufferin.
Organizer: **Ashok K. Dutt**, University of Akron
Chair: **Frank J. Costa**, The University of Akron
4:45 Bruce Taylor, Kuwait Institute for Scientific Research, The Role of Physical Planning in the National Development of Kuwait;
5:05 Yichin Xie, Buchtel College of Arts and Sciences, Spatial Disparities in Urban Socioeconomic Development in China;
5:25 Ming Fan, University of Akron, Urban Land Management in China: Paternalism or Reform.
Discussant: **Steven M. Banks**, Illinois State University.

3156. Env. Perception, Behavioral, Cultural Geo., Latin Am., Native Am. Specialty Groups and IGU Comm on the World Pol. Map: Americanite/Americanness/Americanidad Eur. & Native Indian Roots on Am. Identity: Sharing the N. Am. Continent: Dream & Reality. Civic Ballroom.
Organizers: **Anne Buttimer**, University of Ottawa, **Vincent Berdoulay**, University of Ottawa
Chair: **R. C. Harris**, University of British Columbia
Dean Louder, Universite Laval;
Neil Sterritt, Assembly of First Nations;
David B. Knight, Carleton University.

3157. AAG Archives & Association History Committee: The QR-Reflections (1971-1988) About the Quantitative Revolution, Video as an Archival Thematic Medium II. City Hall.
Organizer: **Maynard Weston Dow**, Plymouth State College
Chair: **Maynard Weston Dow**, Plymouth State College
4:10 "The QR" (60-minute video)
Discussant: **Maynard Weston Dow**, Plymouth State College.

3158. Geomorphology Specialty Group: Fluvial Processes III. Conference B.
Organizer: **Stanley W. Trimble**, University of Chicago
Chair: **Richard W. Reeves**, University of Arizona
4:45 Anthony R. Ladson, University of Minnesota, **Ian D. Moore**, University of Minnesota, **John P. Wilson**, Montana State University, Landscape Assessment and Modeling Using Digital Terrain Analysis;
5:05 Jeffrey A. Lee, Texas Tech University, **David A. Waits**, Texas Tech University, The Red River Boundary Dispute: A Case Study in Political Geomorphology;
5:25 Jack Schmidt, Middlebury College, **B. T. Brown**, Consulting Ecologist, Tucson, AZ, **L. E. Stevens**, Ecologist, Flagstaff, AZ, Regulated Discharge and Marsh Development, Colorado River in Grand Canyon;
5:45 Jonathan Phillips, East Carolina University, Unstable Hydraulic Geometry and Extremal Hypotheses for River Channel Behavior;
6:05 Theodore K. Miller, Indiana University, The Hypothesis of Minimum Variance Reconsidered.

3159. Snow and Ice Climatology. Conference D.
Organizer: **Tomas A. Miller**, Arizona State University
Chair: **Melvin G. Marcus**, Arizona State University
4:45 Fred B. Chambers, Arizona State University, Cold Air Ponding and Cirque Glaciation: Conness Glacier, California;
5:05 Tomas A. Miller, Arizona State University, Energy Balance Investigations: Conness Glacier, Sierra Nevada California;
5:25 Bruce L. Gwilliam, Arizona State University, Energy Balance Investigation of Seasonal Snowmelt, Mormon Mountain, Arizona;
5:45 Diane M. Stanitski, Arizona State University, Radiation Balance Over a Seasonal Snowcover: Mormon Mountain,

Arizona;
6:05 Randy Sedlacek, Arizona State University, Snowfall in Northern Arizona, A Synoptic Climatological Approach.

3160. China Geography Specialty Group: China II: Population, Settlement and Land Use in South China and Taiwan. Peel.
Organizer: **C.P. Lo**, University of Georgia
Chair: **Stanley Toops**, Old Dominion University
4:45 C.P. Lo, University of Georgia, The Pattern of Urban Settlements in Zhujiang Delta, South China — A Spatial Analysis;
5:05 Anthony Gar-On Yeh, University of Hong Kong, **Xueqiang Xu**, Zhongshan University, **Huaying Hu**, Zhongshan University, Social Areas of Ghangzhou;
5:25 Gregory Veeck, Louisiana State University, Changes in Agricultural Land Use in Taiwan: 1983-1987.
Discussant: **Miriam K. Lo**, Mankato State University.

3161. Mathematical Models and Quantitative Methods and GIS Specialty Groups: Morphogenetic Theories III: New Considerations for an Old Debate. Grand Ballroom West, Section Z.
Organizers: **Michel Phipps**, University of Ottawa, **Alain P. Roy**, University of Ottawa
Chair: **Roger A. Roberge**, University of Ottawa
4:45 Mike Woldenberg, State University of New York, Buffalo, **Michael P. O'Neill**, Virginia Tech, **R. Pentney**, State University of New York, Buffalo, **M. Quackenbush**, State University of New York, Buffalo, Models of Tree Growth from Biology and Geomorphology.
Helen Couclelis, University of California-SB;
A. Stewart Fotheringham, State University of New York at Buffalo;
Michael F. Goodchild, University of California-SB;
Carl Amrhein, University of Toronto.

3162. Cartography: Map Accuracy and Effectiveness. York.
Chair: **James Mower**, State University of New York at Albany
4:45 Joseph F. Fontanella, United States Military Academy, An Assessment of Battlefield Map Effectiveness;
5:05 Alan M. MacEachren, Pennsylvania State University, Efficiency and Effectiveness of Map Learning Strategies Using Segmentation;
5:25 Michael E. Hodgson, University of Colorado, Error in Manual Digitizing of Cartographic Point Features;
5:45 Michael E. Hoffpauir, US Military Academy, An Examination of the Cartographic Adequacy of the Flood Insurance Rate Maps for Terrebonne Parish, Louisiana;
6:05 Everett A. Wingert, University of Hawaii, Changing Precedents in Map Accuracy Liability Cases.

3163. Cultural Geography of Hispanic and Prehispanic North America. Elgin.
Chair: **Martha Jean Ferrill**, Northern Michigan University
4:45 Terrence W. Haverluk, University of Minnesota, The Regional Hispanization of the United States: A Case Study: Lubbock, and Lubbock County, Texas;
5:05 Jean Palmer-Moloney, Colorado Mt.College/Summit H.S., Rotan: An Example of Hispanization in the English Western Caribbean;
5:25 Martha A. Works, Portland State University, Trade Relations and Material Culture in Spanish Colonial New Mexico;
5:45 Clint E. Davis, University of Texas at Austin, Colonial Water Control Systems in the Eastern Bajio of Mexico;
6:05 Albert J. Larson, University of Illinois-Chicago, **John Dietz**, University of Northern Colorado, The Evolution of the American West: Colorado's San Luis Valley.

3164. Water and the Environment. Grand Ballroom West, Section Y.
Chair: **Keith W. Muckleston**, Oregon State University
4:45 M.P. Lavine, University of Pittsburgh at Johnstown, The Legacy of the Johnstown Floods;
5:05 Hsiang-te Kung, Memphis State University, **Long-gen Ying**, Memphis State University, A Case Study of Lake Eutrophication of Dianshan Lake, Shanghai, China;
5:25 Robert L. Monahan, Western Washington Univ, British Columbia: The Pacific Coast Pivot in Salmon Aquaculture;
5:45 Willie B. Rand, Jr., Northeastern Illinois University, Principles of In-situ Biological Treatment.

3165. Historical Geography Specialty Group: Student Scholars in Historical Geography I. Conference F.
Organizer: **William K. Wyckoff**, Montana State University
Chair: **William K. Wyckoff**, Montana State University
4:45 Catherine M. Lockwood, University of Minnesota, By Choice, Chance, or Design? Systematic Spacing of Townsites Along South Dakota's Rail Lines: An Historical Analysis of Hypotheses;
5:10 Anne V. O'Connor, University of Illinois, Continuity and Change: The Making of the Commercial Strip;
5:35 Wayne C. Reeves, University of Toronto, The Space of the Child: Supervised Playgrounds in Toronto, 1900-1930;
6:00 Carol J. Rosen, University of Wisconsin-Whitewater, Image and Reality on Wisconsin's Settlement Frontier: 1825-1850.

3166. Applied Specialty Group: Business Meeting. Grand Ballroom East.
Chair: **Bill Leon**, University of Colorado, Colorado Springs

3167. Biogeography Specialty Group: Business Meeting. Dominion South.
Chair: **Susan W. Beatty**, University of Colorado

3168. Cultural Ecology Specialty Group: Business Meeting. Windsor West.
Chair: **Philip W. Porter**, University of Minnesota

3169. Environmental Perception Specialty Group: Business Meeting. Grand Ballroom Centre.
Chair: **Leo Zonn**, East Carolina University

3170. Population Specialty Group: Business Meeting. Conference G.
Chair: **David A. Plane**, University of Arizona

3171. Soviet and East European Specialty Group: Business Meeting. Conference C.
Chair: **Philip Micklin**, Western Michigan University

3172. National Science Foundation Geography and Regional Science Program: Open Session on Proposal Preparation and Program Operation of the NSF Geography and Regional Science Program in the US II. Spin Drift (4th floor)
Organizer: **Thomas J. Baerwald**, NSF
Chair: **Thomas J. Baerwald**, NSF
Discussant: **Thomas J. Baerwald**, NSF

3173. Geographic Studies of Issues in Criminal Justice. Norfolk.
Organizer: **James L. LeBeau**, Southern Illinois University-Carbondale
Chair: **James L. LeBeau**, Southern Illinois University-

Carbondale
4:45 **Keith Harries**, University of Maryland, Baltimore County, A Comparative Geographical Analysis of Drug- and Non-Drug-Related Homicides in the United States, 1976-1983;
5:05 **Arlene C. Rengert**, West Chester University, **George Rengert**, Temple University, Drug Sales Areas as Anchor Points of the Spatial Search of Residential Burglars;
5:25 **James L. LeBeau**, Southern Illinois University-Carbondale, **Robert Langworthy**, University of Cincinnati, The Spatial Behaviors and Social Networks of Auto Thieves Snared by a Police Sting Operation;
5:45 **James V. Spring**, Illinois Criminal Justice Information Authority, Crime as the Latent Product of Implemented Planning Policies.
Discussant: **James L. LeBeau**, Southern Illinois University-Carbondale.

3174. New Models in Geography II. Dominion North.
Organizers: **Richard Peet**, Clark University, **Nigel Thrift**, University of Bristol
Chair: **Nigel Thrift**, University of Bristol
4:45 **Philip Cooke**, University of Wales, New Contradictions for the Nation-State;
5:05 **Ronald J. Johnston**, University of Sheffield, The State, Political Geography and Geography;
5:25 **Ruth Fincher**, University of Melbourne, The Class and Gender Relations of the Local State;
5:45 **David Slater**, CEDLA, University of Amsterdam, In Other Regions: Territorial Politics at the Periphery;
6:05 **Stuart Corbridge**, Cambridge University, Marxism, Post-Marxism and the Geography of Development.
Discussant: **Peter J. Taylor**, University of Newcastle Upon Tyne.

6:45 pm to 8:30 pm

3175. Socialist, Urban, Political, and Geographical Perspectives on Women Specialty Groups: Our Differences: A Postmodern Response to Harvey and Soja. Dominion South.
Organizer: **Neil Smith**, Rutgers University
Chair: **Neil Smith**, Rutgers University
6:45 **Rosalyn Deutsche**, School of Art, Cooper Union, Postmodernism, Feminism, Difference.

7:00 pm to 9:00 pm

3176. Historical Geography, China, Canadian, and Asian Specialty Groups: Distinguished Lectures in the Historical Geography of Social Change I: China. Dominion North.
Organizers: **Carville Earle**, Louisiana State University, **C.P. Lo**, University of Georgia
Chair: **John Marshall**, York University
7:00 **G. William Skinner**, University of California, Davis, Regional Systems and Historical Social Science: Modern China: Spatial Systems and Social Process.
Discussant: **Marwyn Samuels**, Syracuse University.

SATURDAY, APRIL 21

7:00 am to 9:00 am

4001. IGC 1992 Publications Committee. Executive Suite.
Chair: **Donald G. Janelle**, University of Western Ontario

7:00 am to 2:00 pm

4002. Registration. Concourse.

7:00 am to 6:00 pm

4003. Speaker Ready Room. Vide Checkroom (Lower Concourse).

7:15 am to 5:00 pm

4004. Local Arrangements/Press Office. Conference A.

7:40 am to 9:20 am

4005. Global Perspectives on the Informal Sector. Kent.
Chair: **James E. Randall**, University of Saskatchewan
7:40 **Ron Cox**, Michigan State University, **Bruce Pigozzi**, Michigan State University, Impact on Rural Counties of Nonemployment Income;
8:00 **Gregory K. Bain**, University of Florida, Indigenous Entrepreneurship: The Case of Handicrafts;
8:20 **Deborah Hart**, The George Washington University, Deregulating the Informal Sector:Local State Policy and Street Traders in South Africa;
8:40 **Norman Diln**, Louisiana State University, Shreveport, Suq El-Lahamin: An Analysis of an Arab Market in the Old City of Jerusalem;
9:00 **Kathleen Schroeder**, University of Texas at Austin, Senora Cordova's Kitchen: Food Substitution in the Sierra of Piura, Peru.

4006. Soviet and East European and Geographic Perspectives on Women Specialty Groups: Perestroyka and Women: Socio-Economic Responses in the Soviet Union and Poland. Conference C.
Organizer: **Joanna Regulska**, Rutgers University
Chair: **Natasha Barbash**
Joanna Regulska, Rutgers University;
Olga Medvedkov, Wittenberg University-Springfield, OH;
Ksenya Khinchuk, Boston University;
Nancy Fisher-Allison, Portland State University.

4007. GIS Specialty Group: NSF-NCGIA I: Status Report on Research Programs, Plans, Directions. VIP Room.
Organizer: **Barry Wellar**, University of Ottawa
Chair: **Gerard Rushton**, University of Iowa
Barry Wellar, University of Ottawa;
Michael F. Goodchild, University of California-SB;
David M. Mark, NCGIA;
Helen Couclelis, University of California-SB;
Waldo Tobler, University of California, Santa Barbara.

4008. Urban Geography Specialty Group: The Urban "Underclass": Statistical Approaches. Essex.
Organizer: **Eric Sheppard**, University of Minnesota
Chair: **Eric Sheppard**, University of Minnesota
7:40 **Richard Greene**, Shippensburg University, A Two Level Typology of Inner City Poverty Settlements;
8:00 **Steven R. Holloway**, University of Wisconsin, Urban Economic Structure and the Urban Underclass: A Possible Link;

8:20 Thomas J. Cooke, Indiana University, J. Matthew Shumway, Indiana University, Accessibility to Employment of Central City Residents: The Case of the Urban Midwest;
8:40 John B. Fieser, Economic Development Administration, Black Long-Duration Unemployment in the U.S., 1981-1988.

4009. Hazards and Cultural Ecology Specialty Groups: Human Ecology of Global Warming. Dominion South.
Organizers: **Peter M. Morrisette**, Resources for the Future, **William Riebsame**, University of Colorado
Chair: **Peter M. Morrisette**, Resources for the Future
7:40 William Riebsame, University of Colorado, Can Societies Adapt to Global Warming?;
8:00 Peter Timmerman, University of Toronto, Moving Up: Wrestling with the Study of Higher-Order Climate Impacts and Responses;
8:20 William E. Easterling, Resources for the Future, Can the Agricultural Research Establishment Keep Pace with Climate Change?;
8:40 Thomas E. Downing, University of Birmingham, African Household Food Security: Mechanisms to Cope with Climatic Variations.
Discussants: **Philip W. Porter**, University of Minnesota, **Roger Kasperson**, Clark University.

4010. Water Resources Specialty Group: Water Law. Kenora.
Organizer: **Olen P. Matthews**, Oklahoma State University
Chair: **Olen P. Matthews**, Oklahoma State University
7:40 Olen P. Matthews, Oklahoma State University, The Law of the Arkansas;
8:00 Mary McNally, Eastern Montana College, Indian Reserved Water Rights and Water Marketing: Some Emerging Issues;
8:20 Teresa L. Bulman, University of California, Davis, Law and the Landscape: Private Reservoirs in Napa County, California;
8:40 Judith M. Dworkin, Meyer, Hendricks, The Legal Ramifications of Floodplain Delineation: A Southwestern Experience;
9:00 Allen C. Turner, University of Idaho, The Role of the Court in Shaping the Western Waterscape.

4011. Industrial Geography and Political Geography Specialty Groups: The Industrial Geography of the 1990s. Huron.
Organizer: **Daniel C. Knudsen**, Indiana University
Chair: **Janet E. Kodras**, Florida State University
7:40 Daniel C. Knudsen, Indiana University, A Midwestern Industrial Geography of the Fourth Kondratieff Wave;
8:00 David L. Rigby, University of California-Los Angeles, The Regional Dynamics of Canadian Manufacturing, 1961-1984;
8:20 Ann Markusen, Rutgers University, The Rise of the Gunbelt;
8:40 Richard Barff, Dartmouth College, **Michael Donaghu**, Dartmouth College, The Organization of Flexibly Specialized Mass Produced Athletic Footwear: A Case Study of Nike Inc.;
9:00 Richard Florida, Carnegie Mellon University, Transplant Production Complexes and the Spatial Division of Labor.

4012. Cultural Ecology and Latin America Specialty Groups: Ecology, Culture, and Economy in the Central Andes. Dufferin.
Organizer: **Karl S. Zimmerer**, University of North Carolina at Chapel Hill
Chair: **Daniel W. Gade**, University of Vermont
7:40 Charles G. Mahaffey, Augustana College, Agriculture and Change in Achoma Peru;
8:00 Daniel W. Gade, University of Vermont, Settlement Regression and Malaria: The Case of Mizque, Bolivia;
8:20 Hildegardo Cordova Aguilar, Catholic University of Peru/University of Vermont, Integral Rural Development: Theory and Reality;
8:40 Karl S. Zimmerer, University of North Carolina at Chapel Hill, Common Field Agriculture in the Central Andes: Struggles Over Production, Space, and Ecology in the 16th and 20th Centuries;
9:00 Kent Mathewson, Louisiana State University, **William M. Denevan**, University of Wisconsin-Madison, John Michael Treacy (1948-1989): A Tribute.

4013. Climate Specialty Group: Synoptic Climatology I: Precipitation Variability. Conference D.
Organizers: **Robert E. Davis**, University of Virginia, **Julie A. Winkler**, Michigan State University
Chair: **Robert E. Davis**, University of Virginia
7:40 Thomas B. Micuda, Indiana University, Precipitation Variability in the Southeast United States and Ocean-Atmosphere Interactions;
8:00 Adam W. Burnett, Michigan State University, Teleconnective Associations with Regional Scale Troughing Events in the Southwestern United States;
8:20 David R. Easterling, Indiana University, **Richard L. Brinegar**, Indiana University, The Role of Surface-Atmosphere Feedback in the Midwestern Drought of 1988;
8:40 Russell S. Vose, University of Delaware, A Regional Synoptic Index for the Delaware River Basin;
9:00 Julie A. Winkler, Michigan State University, Principal Components Analysis of Subsynoptic-Scale Circulation Fields Preceding Heavy Precipitation.

4014. Population Specialty Group: Population and Employment Deconcentration. Conference E.
Organizer: **Thomas Kontuly**, University of Utah
Chair: **Thomas Kontuly**, University of Utah
7:40 A.G. Champion, University of Newcastle Upon Tyne, Recent Trends in Population Distribution in Great Britain and Their Relationship to Patterns of Employment Change;
8:00 Thomas Kontuly, University of Utah, Employment Deconcentration and Counterurbanization in the Federal Republic of Germany;
8:20 Larry Long, US Bureau of the Census, **Diana DeAre**, US Bureau of the Census, Economic Change and the Evolution of Counterurbanization in the United States.

4015. GIS and Biogeography Specialty Groups: GIS and Natural History Collections. Grand Ballroom West, Section Y.
Organizer: **Matthew McGranaghan**, University of Hawaii
Chair: **Jerome E. Dobson**, Oak Ridge National Laboratory
Warren U. Brigham, Illinois Natural History Survey;
James Edwards, National Science Foundation;
James H. Beach, Michigan State University;
Thomas J. Baerwald, National Science Foundation;
David R. Lindberg, Museum of Paleontology, UC-Berkeley;
David J. De Laubenfels, Syracuse University;
Brian Klinkenberg, University of British Columbia;
David M. Mark, NCGIA.

4016. FIPSE Project Discussion: Improving Pre-service Teacher Training in Geography. Grand Ballroom West, Section Z.
Organizers: **Ruth I. Shirey**, Indiana University of Pennsylvania, **Richard Boehm**, Southwest Texas State University
Chair: **David A. Lanegran**, Macalester College
Richard Boehm, Southwest Texas State University;
Richard T. Anderson, Salem State College;
Alice Andrews, George Mason University;
Douglas C. Wilms, East Carolina University;
William R. Strong, University of North Alabama;

Joseph P. Stoltman, Western Michigan University; **Stephen A. Justham**, Kutztown University; **Clifford B. Craig**, Utah State University.

4017. Biogeography: Quaternary Environmental Change. York.

Chair: **Anthony M. Davis**, University of Toronto

7:40 Lisa Graumlich, University of Arizona, Spatial Structure of Taxa Abundances in Late Holocene Vegetation Records;

8:00 Miriam Lee Fearn, Louisiana State University, **Kam-biu Liu**, Louisiana State University, Lake Sediment and Pollen Records of Hurricane Disturbance Along the Gulf Coast of Alabama;

8:20 Glen Fredlund, University of Kansas, Pleistocene Prairies in the Central Great Plains of North America: Palynological Evidence;

8:40 Steven A. Jennings, University of Oregon, **Wayne R. Owen**, University of California, Davis, Numerical Analysis of Modern and Paleo-Plant Communities in the White Mountains, CA-NV;

9:00 Zhi-Jun Liu, University of Iowa, Analysis of Long-term Cyclic Dynamics of Simulated Forest Stands.

4018. GIS/Analytical Cartography: Digital Terrain Analysis and Mapping. Norfolk.

Chair: **Stephen C. Guptill**, U.S. Geological Survey

7:40 Amanda Espy, University of Alabama, **John M. Harlin**, University of Alabama, Comparative Terrain Analysis of Earth, Mars, and Venus Through Digital Terrain Modelling;

8:00 Richard Lammers, University of Toronto, **Lawrence E. Band**, University of Toronto, Statistical Generalization of 3-Dimensional Terrain Information;

8:20 Joseph H. Astroth Jr., University of Missouri, **R. David Hammer**, University of Missouri, **Timothy L. Haithcoat**, University of Missouri, Planimetric Accuracy of Various Methodologies Used to Incorporate Digital Elevation Data Into a GIS for the Production of Slope Class Maps;

8:40 Harold Moellering, Ohio State University, **Jon Kimerling**, Oregon State University, Examples of Digital Slope-Aspect Displays: A New Analytical Approach in Cartography;

9:00 Jay Lee, University of Georgia, Triangulating Irregularly Distributed Elevation Data.

4019. Third World: Political and Cultural Geography. Grand Ballroom West, Section X.

Chair: **Stanley Toops**, Old Dominion University

7:40 Eugene Kirchherr, Western Michigan University, The Changing Political Status of the African Mandated/Trust Territories, 1945-1950;

8:00 Hendrik-Jan A. Reitsma, University of Amsterdam, **Leo de Haan**, University of Amsterdam, Northern Togo and the World;

8:20 Christine Drake, Old Dominion University, A Comparison of National Integration in China and Indonesia;

8:40 Roberto L. Monte-Mor, GSAUP - University of California, Los Angeles, **Sumanta Ray**, GSAUP/University of California-Los Angeles, Post-*.ism in the Third World: Fragments from Brazil and India;

9:00 Vernon Domingo, Bridgewater State College, The Role of the Third World in International Merchant Shipping.

4020. North American Agriculture I. Carlton.

Chair: **J. Harold Leaman**, Villanova University

7:40 William M. Holmes, University of North Texas, The Capitol Syndicate and British Agricultural Experiment Stations in the Southern Great Plains;

8:00 Brad Bass, Atmospheric Environment Service, How Important is Climate Information for Integrated Pest Management?

8:20 James A. Brey, University of Wisconsin Centers, Spatial Dimensions of the Florida Citrus Canker Eradication Program, 1984-1988;

8:40 Vern Harnapp, University of Akron, Guayule: Rubber from the Desert;

9:00 Jeanne Maurer, University of Toronto, Marginal Agriculture: A Yukon Case Study.

4021. Topics in Historical Geography. Windsor East.

Chair: **Ralph D. Vicero**, California State University, Northridge

7:40 Rutherford H. Platt, University of Massachusetts at Amherst, Ecological Perils of Global Urbanization: Lessons from the 19th Century Experience in the Developed World;

8:00 Engin F. Isin, University of Toronto, The Police Towns of British North America;

8:20 Richard H. Schein, Central Michigan University, Influences on the Colonization of Post-Revolutionary Central New York;

8:40 Daniel E. Turbeville, Eastern Oregon State College, Fire and Comparative Urban Growth: Seattle and Vancouver, 1885-1920;

9:00 Cynthia A. Miller, Syracuse University, From the Country and From the City: The Geography of Military Recruiting, 1825-1846.

4022. Coastal Zone Management: Recent Developments. Simcoe.

Chair: **Lynn R. Phillips**, Carteret County Planning Dept.

7:40 V. Chris Lakhan, University of Windsor, Water Control and the Development of Agriculture on Guyana's Coastland;

8:00 David A. Duffus, University of Victoria, **Philip Dearden**, University of Victoria, A Conceptual Framework for the Analysis and Management of Wildlife-Oriented Recreation in the Coastal Zone;

8:20 Ennis Chestang, East Carolina University, **Philip Shea**, East Carolina University, The Fishing Piers of Coastal Carolina: A Traditional Resource Under Contemporary Pressures;

8:40 Lynn R. Phillips, Carteret County Planning Department, **Walter F. Clark**, UNC Sea Grant Consortium, Management of Competing Uses in North Carolina's Coastal Waters;

9:00 Clarence M. Head, University of Central Florida, Development of Restoration Techniques for Wekiva Basin, Florida.

4023. Ideology and Landscapes. Conference G.

Chair: **Darrell A. Norris**, S. U. N. Y. Geneseo

7:40 Allan Pred, University of California at Berkeley, The World Inside Out and Upside Down: South Korean Capital and Symbolic Discontent in a California Industrial Town;

8:00 Tom Schmiedeler, University of Kansas, Historic Processes Affecting Town Morphology in North-Central Kansas;

8:20 Artimus Keiffer, Kent State University, The Role of Utopian Thinking in American Architecture and Planning;

8:40 Robert M. Newcomb, California State University, Northridge, Sleeping Landscapes: Historic Sites Where Time Stands Still;

9:00 Heidi J. Nast, McGill University, The Kano Palace: A Pre-Colonial Setting in a Post-Colonial Context.

4024. Migration and Urbanization. Conference B.

Chair: **Amrit Lall**, University of Windsor

7:40 Odeibler Santo Guidugli, University of the State of Sao Paulo, Differential Urban Growth and the Population Redistribution: The Sao Paulo State Case;

8:00 Thomas D. Boswell, University of Miami, **James E. Biggs**, University of Miami, Urbanization in the Bahamas;

8:20 Doreen J. Mattingly, University of California-Los

Angeles, Secondary Migration of Indochinese Refugees Within California;
8:40 Jacques Ledent, INRS Urbanisation/University of Quebec, The Geographical Mobility of Hispanics in the United States;
9:00 Alan Nash, Concordia University, World Refugees and the Canadian Response.

4025. Geomorphology Specialty Group: Business Meeting. Grand Ballroom East.
Chair: **David R. Butler**, University of Georgia

4026. Technological Hazards: Problems and Choices. Dominion North.
Chair: **Eve Gruntfest**, University of Colorado, Colorado Springs
7:40 William D. Solecki, Rutgers University, Acute Chemical Spills and the Hazardousness of Rural Places;
8:00 K. David Pijawka, Arizona State University, **Alvin H. Mushkatel**, Arizona State University, **Joanne Nigg**, Arizona State University, Perceptions of Risks of Transporting Hazardous Materials;
8:20 Antony P. Wood, Boston University, **Chi-Ho Sham**, Boston University, Samuel J. Ratick, CENTED, Clark University, Factors Influencing Accidental Releases of Toxic Chemicals in the US;
8:40 John Tiefenbacher, Rutgers University, Population Exposure to Pesticide Drift in Suburbanized Agricultural Areas;
9:00 Omie E. Medford, Colgate University, An Examination of the Variability of Damage Potential Within the 100-Year Floodplain of Wilkes-Barre, Pennsylvania.

4027. Remote Sensing/GIS: Resources. Elgin.
Chair: **Janet Gritzner**, South Dakota State University
7:40 Cyrus B. Dawsey, Auburn University, Low-Cost Computer Mapping and Imagery Analysis of Small, Remote Regions;
8:00 Keith W. Rice, University of Wisconsin-Stevens Point, **Donald Last**, University of Wisconsin-Stevens Point, GIS Determination of Agricultural Land Production Potential and Property Values;
8:20 Ronald A. Weinkauf, University of Wisconsin-La Crosse, **Paul K. Stoelting**, University of Wisconsin - La Crosse, Satellite (AVHRR) Temperature Measurements of Upper Mississippi River Pools;
8:40 Emily Schwalen, San Francisco State University, Land Classification for Range Management at Point Reyes National Seashore;
9:00 Donald W. Maxfield, Northern Illinois University, Forest Cover Detection in Thailand.

4028. Affirmative Action and Minority Status Committee: Panel Discussion: Perspectives on the Recruitment and Retention of Minority Students in Geography. Wentworth.
Organizers: **David Organ**, University of California at Berkeley, **Deborah Berman-Santana**, University of California at Berkeley, **Jorge G. Lizarraga**, University of California at Berkeley
Chair: **DeWitt Davis Jr.**, University of the District of Columbia

4029. Historical Migration. Peel.
Chair: **Branko Colakovic**, Mankato State University
7:40 Neil Smith, Rutgers University, The M-Project: Isaiah Bowman and Refugee Resettlement, 1938-1944;
8:00 Ali Modarres, University of Arizona, Iranian Immigration and Settlement in the US;
8:20 Brian M. Evans, University of Winnipeg, The Distribution of Welsh Immigrants in the USA in 1900;
8:40 Richard L. Rieck, Western Illinois University, Emigrant and Livestock Mortality on the Oregon and California Trails;
9:00 Elizabeth Buchanan, University of Toronto Schools, The Unfulfilled Promise of "New Lands": Geographical Mobility in a Canadian Context.

8:00 am to 9:20 am

4030. Mathematical Models and Quantitative Methods Specialty Group and IGU Commission on Mathematical Models: Models of Spatial Choice and Decisionmaking. Windsor West.
Organizer: **Carl Amrhein**, University of Toronto
Chair: **Ross MacKinnon**, SUNY-Buffalo
8:00 Peter Rogerson, State University of New York at Buffalo, Spatial Models of Sequential Choice;
8:20 Leslie Curry, University of Toronto, The Gravity Model as a Transfer Function;
8:40 Harvey J. Miller, Ohio State University, Path Selection in Spatial Search Behavior;
9:00 Y. Y. Papageorgiou, McMaster University, **G. Leonardi**, McMaster University, Conceptual Foundations of Spatial Choice Models.

4031. Cartography: General. Conference F.
Chair: **Judith A. Tyner**, CSU-Long Beach
8:00 Stephen Lavin, University of Nebraska, Lincoln, **Richard M. Smith**, University of Arkansas, Why an "Electronic" Atlas?;
8:20 Robert B. Kent, University of Akron, **Thomas J. Tobias**, Department of Transportation, New York State, State Atlases:Funding Sources and Thematic Content;
8:40 Arthur Krim, Salve Regina College, Route 66: Mapping an American Highway.

4032. Medical Specialty Group: Business Meeting. City Hall.
Chair: **Robert Earickson**, Univ of Maryland-Baltimore Co

4033. Transportation Specialty Group: Business Meeting. Cinema I.
Chair: **William R. Black**, Indiana University

8:15 am to 9:20 am

4034. Energy and Environment Specialty Group: Business Meeting. Civic Ballroom.
Chair: **Barry D. Solomon**, US Environmental Protection Agency

4035. Political Specialty Group: Business Meeting. Grand Ballroom Centre.
Chair: **Andrew Kirby**, University of Arizona

4036. Rural Development Specialty Group: Business Meeting. Cinema II.
Chair: **Paul Frederic**, University of Maine-Farmington

9:00 am to 12:00 noon

4037. Field Trip 17: Historical Margin of Downtown.
Organizer: **John Warkentin**, York University

9:00 am to 5:00 pm

4038. Paper Sales. Sheraton Hall.

4039. Convention Placement Service. Promenade (Lower Concourse).

4040. Exhibits. Sheraton Hall.

9:30 am to 10:50 am

4041. Presidential Plenary Session II: Sharing the Global Village: Transnational and Regional Pooling and Competition. Geographic contributions to understanding issues to be faced by the 1992 United Nations Conference on Environment and Development. Grand Ballroom East.
Organizer: **Gilbert F. White**, University of Colorado
Chair: **Gilbert F. White**, University of Colorado
Wilfred Bach, University of Munster;
Kathleen Braden, Seattle Pacific University;
Samuel N. Goward, University of Maryland;
Vladimir M. Kotlyakov, Institute of Geography, USSR Academy of Sciences;
B. L. Turner, Clark University;
Anne V. Whyte, International Development Research Center;
Thomas J. Wilbanks, Oak Ridge National Laboratory;

9:30 am to 12:00 noon

4042. Poster Session: Physical Geography II (Biogeography, Remote Sensing), Cartography, Mathematical Models, Research Methods. Sheraton Hall.
Anne Walker, Ph.D. Associates, Inc., **Susan Gray**, Ph.D. Associates, Inc., Multi-Satellite Comparison Using a Geographic Analysis and Display System (GADS);
Charles E. Bussing, Kansas State University, **M. Duane Nellis**, Kansas State University, Textural Algorithms for Rural Land Use Analysis in Botswana;
Robert R. J. Mohler, Lockheed Engineering & Sciences Company, **A. K. Singhal**, Lockheed Engineering & Sciences Company, **G. W. Deardorff**, Lockheed Engineering & Sciences Company, **W. S. Beckham**, NASA/Johnson Space Center, Accommodating Scientific Payloads Onboard the Space Shuttle;
John R. Giardino, Texas A&M University, **Michael Helfert**, NASA/Johnson Space Center, **Kamlesh Lulla**, NASA/Johnson Space Center, **Robert R. J. Mohler**, Lockheed Engineering & Sciences Company, Areal Change of the Omo Delta, Ethiopia, Using Digitized Space Shuttle Photography;
Paul W. Mausel, Indiana State University, Soil Pattern Delineations Using Computer Analyzed Multispectral Video Data;
Jeffrey D. Colby, University of Colorado, Global Change Diskette Project;
Richard C. Daniels, Miami University, The Affects of Training Field Size on Image Classification Accuracy;
Sally L. Gros, University of Oklahoma, Satellite Remote Sensing in Assessment of Surface Environmental Impacts of Oil and Gas Activities;
Danielle Marceau, University of Waterloo, **Jean-Marie M. DuBois**, Universite de Sherbrooke-Quebec, **Philip J. Howarth**, University of Waterloo, Use of the Grey-Level-Cooccurrence-Matrix (GLCM) Texture-Analysis Method in Land-Cover Classification;
Sumith Pathirana, Kent State University, **Peter F. Fisher**, Kent State University, The Relation Between Land Cover Type and Fuzzy Membership of Land Cover Classes Derived from LANDSAT Imagery;
Qiang Tao, Louisiana State University, Detection of Surface Currents and Sediment Plums Using AVHRR Imagery;
Joan M. Welch, Boston University, Street and Park Trees of Roxbury and North Dorchester: Patterns of Urban Inequality;
Francis Precht, Frostburg State University, Changes in Spatial Pattern During Subalpine Fir Forest Development;
Paul A. Knapp, University of Nevada, Spatial Variability in Natural Recovery Processes in the American West;
Lara M. Dando, Montana State University, **Katherine J. Hansen-Bristow**, Montana State University, Recent Changes in Tree Distribution Near Butte, Montana;
Joseph W. Bencloski, Indiana University of Pennsylvania, The Spread of Rabies in Pennsylvania, 1982-1989;
Robin J. Rapal, University of North Dakota, Using 35mm Aerial Photographs for Assessing Prairie Plant Species;
Deborah Fridell, San Diego State University, **Barbara Fredrich**, San Diego State University, **Richard Wright**, San Diego State University, Analysis of the Impacts of Off-Road Vehicle Use in Hungry Valley California State Vehicular Recreation Area;
Eugenie Roval, Western Kentucky University, The Modifiable Areal Unit Problem and Spatial Analysis;
Leo I. Dillon, US Department of State, Territorial and Cultural Ethnic Claims in the Soviet Union;
Richard E. Groop, Michigan State University, Small Scale Map Analysis with ARC/INFO;
Thomas W. Hodler, University of Georgia, **Philip W. Suckling**, University of Georgia, Using "SURFER" Graphics to Study Precipitation Normals in the Southeast;
Bruce W. Meier, Miami University, **Cyrus W. Young**, Miami University, Scaling Solid Color Overlapping Graduated Circles;
James W. Scott, Western Washington University, **Bruce C. Sarjeant**, Western Washington University, Washington: A Centennial Atlas;
Maxx Dilley, Pennsylvania State University, Monitoring Development Projects Geographically;
Craig ZumBrunnen, University of Washington, USSR GIS Data Base;
Bruce A. Ralston, University of Tennessee, **Cheng Liu**, University of Tennessee, **Linda Ralston**, The Matrix Group, A Transportation Planning System for Bangladesh;
Robert G. Cromley, University of Connecticut, **Gerard M. Campbell**, University of Connecticut, A Constrained Shortest Path Model for Simplifying Encoded Lines;
John D. Nystuen, The University of Michigan, **Sandra L. Arlinghaus**, Institute of Mathematical Geography, **William C. Arlinghaus**, Lawrence Tech University, Elements of Geometric Routing Theory—II;
Gary G. Peterson, University of Arizona, A Microcomputer-based Approach to Land Use Planning and Map Analysis Instruction;
Grady B. Meehan, Salisbury State University, Revisiting Peirce Lewis' 1965 Cartographic Analysis of Electoral Geography in Light of Current GIS Technology.

11:05 am to 12:45 am

4043. Geomorphology Specialty Group: Hillslope Processes. Grand Ballroom West, Section Y.
Organizer: **Athol D. Abrahams**, State University of New York at Buffalo
Chair: **Lawrence E. Band**, University of Toronto
11:05 **Athol D. Abrahams**, State University of New York at Buffalo, Is the Concept of Detachment-Limited Erosion Valid on Semiarid Hillslopes?;
11:25 **Rorke B. Bryan**, University of Toronto, The Hydrological Significance of Surface Crusting and Rill Generation;
11:45 **Hugh Hamilton**, University of Toronto, **Shiu-hung Luk**, University of Toronto, Hyperconcentration Effects in the Delivery of Sediment to a First-Order Catchment, Loess Plateau, China;
12:05 **James S. Gardner**, University of Waterloo, **Jane Law**, University of Waterloo, Coastal Dune Slope Processes in Cold Conditions;
12:25 **Francisco L. Perez**, University of Texas, Talus Shift Near Rock Outcrops in the California Cascades.

4044. International Geographical Union Commission on the World Political Map and the Political Geography Specialty

Group: Ethnonationalism: Geography and Social Theory. Conference G.

Organizer: **Shantha K. Hennayake**, Syracuse University

Chair: **David B. Knight**, Carleton University

11:05 Alexander B. Murphy, University of Oregon, Ethno-Nationalism and the Social Construction of Place;

11:25 Nuala C. Johnson, Syracuse University, The Building of a Nation: Some Aspects of Language and Education Polity in Post-Independence Ireland;

11:45 Patrick O'Sullivan, Florida State University, British and IRA Strategy and Tactics in Northern Ireland;

12:05 Shantha K. Hennayake, Syracuse University, Between Nationalism and Separatism: An Alternative Explanation of Ethnic Separatism.

Discussants: **Fred Shelley**, University of Southern California, **John Agnew**, Syracuse University.

4045. Urban Geography Specialty Group: Urban Canada: Recent Trends and Policy Issues. Windsor East.

Organizers: **Larry S. Bourne**, University of Toronto, **David Ley**, University of British Columbia

Chair: **David Ley**, University of British Columbia

11:05 Deryck W. Holdsworth, Pennsylvania State University, The Mix of Public and Private in Canada's Urban Landscapes;

11:25 Damaris Rose, University of Quebec, **Paul Villeneuve**, Laval University, Work, Labour Markets and Households in Transition in Canadian Metropolitan Areas;

11:45 Michael J. Broadway, State University of New York at Geneseo, Deprivation and Social Upgrading in Canadian Inner Cities;

12:05 John Miron, University of Toronto, Lessons Learned from Canada's Postwar Housing Experience.

4046. Historical Geography, China, Canadian and Asian Specialty Groups: Distinguished Lectures in the Historical Geography of Social Change II. Essex.

Organizers: **Carville Earle**, Louisiana State University, **C.P. Lo**, University of Georgia

Chair: **Carville Earle**, Louisiana State University

11:05 G. William Skinner, University of California-Davis, Regional Systems and Historical Social Science: Japan and France at the Onset of Modernization — A Comparison.

Discussant: **John Agnew**, Syracuse University.

4047. Ontario Association for Geographic and Environmental Education: Geography Educator Preparation: Trends and Program in Ontario. Huron.

Organizers: **Colin J. Ball**, Ontario Assoc. for Geographic & Environmental Education, **Marilyn Brown**, Hamilton Board of Education-Canada

Chair: **Colin J. Ball**, Ontario Assoc. for Geographic & Environmental Education

Colin J. Ball, Ontario Assoc. for Geographic & Environmental Education;

Marilyn Brown, Hamilton Board of Education-Canada;

Gib Goodfellow, City of Toronto Board of Education.

4048. GIS and Cartography Specialty Groups: Verbal Directions for Wayfinding. Conference B.

Organizer: **Scott M. Freundschuh**, State University of New York at Buffalo

Chair: **Matthew McGranaghan**, University of Hawaii

11:05 Sucharita Gopal, Boston University, "Walk Down the Hill and Turn Left . . .";

11:25 Michael D. Gould, State University of New York at Buffalo, Comparing Driving Directions in English- and Spanish-Speaking Cultures;

11:45 Scott M. Freundschuh, State University of New York at Buffalo, **David M. Mark**, NCGIA, A Study of Spoken and Written Driving Directions;

12:05 Helen Couclelis, University of California-SB, Verbal Directions for Way-Finding: Why Should We Care?.

Discussant: **Barbara B. Petchenik**, Donnelley Cartographic Services.

4049. GIS Specialty Group: GIS and the Grand Traditions of Geography. Grand Ballroom East.

Organizer: **Jerome E. Dobson**, Oak Ridge National Laboratory

Chair: **David Cowen**, University of South Carolina

11:05 David M. Mark, NCGIA, GIS and Pattison's "The Four Traditions of Geography";

11:25 Ronald F. Abler, Association of American Geographers, Whence GIS? Alexandria, Palermo, Antwerp, and Montfort;

11:45 Brian Klinkenberg, University of British Columbia, Cross-Field Terminology and GIS;

12:05 David Cowen, University of South Carolina, **Lynn Shirley**, University of South Carolina, GIS and Classical Location Theory.

4050. Urban and Socialist Geography Specialty Groups: Author Meets Critics: Ed Soja's Postmodern Geographies. Grand Ballroom West, Section X.

Organizer: **Neil Smith**, Rutgers University

Chair: **Neil Smith**, Rutgers University

Derek Gregory, University of British Columbia;

Andrew Kirby, University of Arizona;

Liz Bondi, Edinburgh University;

Michael Dear, University of Southern California;

Edward W. Soja, University of California-Los Angeles;

4051. Regional Development and Planning Specialty Group: Regional Development and Planning: Global Examples. Grand Ballroom Centre.

Organizer: **John E. Benhart**, Shippensburg University

Chair: **John E. Benhart**, Shippensburg University

11:05 John E. Benhart, Shippensburg University, The Pennsylvania Iron and Steel Industry: Regional Planning and Development Strategies;

11:25 Robert Donnell, Framingham State College, **William Massicott**, Central Transportation Planning Staff, Comparative Visual Analysis of the Urban Design Structure of Boston, Massachusetts and Toronto, Ontario;

11:45 Andrew Leyshon, University of Bristol, **Martin Boddy**, University of Bristol, **Nigel Thrift**, University of Bristol, A Long Way Down the Line: Long Distance Commuting from the M4 Corridor;

12:05 Rodger K. Menzies, US Army Corps of Engineers, Environmental and Engineering Policies Influencing Construction of Tidal Surge Barriers in the United States, Europe and Asia.

Discussant: **Debnath Mookherjee**, Western Washington University.

4052. Rural Development, Canadian, Energy and Environment, and Recreation, Tourism, and Sport Specialty Groups: Global Linkages in Regional Development: Comparative European-North American Perspectives. VIP Room.

Organizers: **Ole Gade**, Appalachian State University, **Vincent P. Miller**, Indiana University of Pennsylvania

Chair: **Gopal S. Kulkarni**, Indiana University of Pennsylvania

11:05 Vincent P. Miller, Indiana University of Pennsylvania, Societal Labeling as a Spatial Factor in the Resistance to Change;

11:25 Lennart Andersson, President, University of Karlstad, An "Ideal" Model for Handling Development Situations in Marginal Areas;

11:45 Lage Wahlstrom, Gothenburg University, Development in Marginal Areas in Sweden;
12:05 Robert E. Reiman, Appalachian State University, Communities and Planning in Appalachia: The Application of Theoretical Framework;
12:25 Lars Aronsson, Gothenburg University, Tourism and Local Development: Utilization of Time, Space and Resources.

4053. Climate and Water Resources Specialty Groups: Regional Perspectives on an Emerging Global Hydrology III: Global Examples. York.
Organizers: **David A. Howarth**, University of Louisville, **Katherine K. Hirschboeck**, Louisiana State University
Chair: **David A. Howarth**, University of Louisville
11:05 Katherine K. Hirschboeck, Louisiana State University, Geography and the Emerging Global Hydrology;
11:25 Peter Waylen, University of Florida, **Cesar N. Caviedes**, University of Florida, Regional Survey of the Effects of ENSO Events on Stream Flow in South America;
11:45 David A. Howarth, University of Louisville, **John N. Rayner**, The Ohio State University, ENSO-Related Variations in Atmospheric Moisture Over the Southern Hemisphere;
12:05 Johannes Feddema, University of Delaware, Evaluation of Terrestrial Climate Sensitivity Using a Moisture Index.

4054. Geographic Perspectives on Women Specialty Group: Sharing the Global Village: Feminist Perspectives. Peel.
Organizer: **Joanna Regulska**, Rutgers University
Chair: **Joanna Regulska**, Rutgers University
Charlotte Bunch, Rutgers University;
Ruth Pearson, University of East Anglia;
Susan E. Place, California State University, Chico;
Janice Monk, University of Arizona;
Joanna Regulska, Rutgers University.

4055. Environmental Perception Specialty Group: Place in Cinema. Norfolk.
Organizer: **Leo Zonn**, East Carolina University
Chair: **Leo Zonn**, East Carolina University
11:05 Peter J. Hugill, Texas A&M University, Dystopian Views of the Future in Science Fiction Films;
11:25 Leo Zonn, East Carolina University, Identity and Landscape Symbolization in Australian Cinema;
11:45 Christina Beal Kennedy, California State University, Hayward, The Desert in "Lawrence of Arabia": Backdrop or Actor?;
12:05 Stuart C. Aitken, San Diego State University, A Transactional Geography of the Image Event.
Discussant: **Martyn J. Bowden**, Clark University.

4056. Recreation, Tourism, and Sport Specialty Group: Tourism and Development. Conference F.
Organizer: **Richard W. Butler**, University of Western Ontario
Chair: **Richard W. Butler**, University of Western Ontario
11:05 Wolfgang Haider, Carleton University, The Dachstein-Tauern Region: Part of the European Playground;
11:25 Philip Dearden, University of Victoria, Sustainable Development and Tourism: Some Examples from Thailand;
11:45 Richard D. Hecock, Oklahoma State University, Recent Amenity Driven Development of Minnesota Lakeshore.
Discussants: **G. Dickinson**, University of Glasgow, **Richard V. Smith**, Miami University.

4057. Cultural Ecology and Socialist Geography Specialty Groups: Ecopolitical Economy of Underdevelopment I. Windsor West.
Organizers: **Lakshman S. Yapa**, Pennsylvania State University, **Ben Wisner**, Hampshire College
Chair: **Anthony R. De Souza**, National Geographic Society
11:05 Stephen G. Bunker, University of Wisconsin-Madison, Paradigm Clash and Political Struggle Over the Ecological and Social Consequences of Extractive Export Economies;
11:25 Margaret FitzSimmons, University of California - Los Angeles, Conceptions of Nature and Eco-Political Economy;
11:45 Nanda R. Shrestha, University of Wisconsin-Whitewater, Frontier Squatter Settlement and Production Relations: The Case of Nepal Tarai;
12:05 Ben Wisner, Hampshire College, Life Technics for Sustainability and Justice.
Discussant: **James M. Blaut**, University of Illinois-Chicago

4058. Energy and Environment and Climate Specialty Groups: Global Warming and Climate: Implications and Strategies. Dominion South.
Organizer: **Susan Macey**, Southwest Texas State University
Chair: **Barry D. Solomon**, US Environmental Protection Agency
11:05 Randall S. Cerveny, Arizona State University, Trends in Upper Air Circulation: Implications to the Greenhouse Effect;
11:25 Stewart J. Cohen, Canadian Climate Centre, Regional Impacts of Projected Global Warming: Research Challenges;
11:45 Wilfred Bach, University of Munster, An Emission Reduction Strategy for Protection of the Global Climate.
Discussant: **Paul A. Kay**, University of Nebraska-Lincoln.

4059. Hazards, Cultural Ecology, Water Resources, Energy and Environment, and Historical Specialty Groups: Crisis Zones and Global Environmental Change: Theory and Application I. Dominion North.
Organizer: **B. L. Turner**, Clark University
Chair: **B. L. Turner**, Clark University
11:05 Roger Kasperson, Clark University, **B. L. Turner**, Clark University, Dominic Golding, Clark University, **William B. Meyer**, Clark University, **Samuel J. Ratick**, CENTED, Clark University, **Kirstin M. Dow**, Clark University, **J.X. Kasperson**, Clark University, Geographic Approaches to Global Environmental Change;
11:25 Kirstin M. Dow, Clark University, Concepts of Environmental Crisis;
11:45 Vladimir V. Annenkov, Institute of Geography, USSR Academy of Sciences, Noosphere and Global Change.
Discussant: **Gilbert F. White**, University of Colorado at Boulder.

4060. "Sustainable Development" as the New International Mantra: What Does It Mean, Why Should We Care, What Should Be Done? Elgin.
Organizer: **Michael Maniates**, Radford University
Chairs: **Michael Maniates**, Radford University, **Ronnie Lipschutz**, Pacific Institute
11:05 Ronnie Lipschutz, Pacific Institute, Wasn't the Future Wonderful? Resources, Environment, and the Emerging Myth of Global Sustainable Development;
11:20 Jesse Ribot, Energy and Resources Group, UCB, Is Sustainable Development Possible? Urbanization and the Political Economy of Africa's Rural Decline;
11:35 Michael Maniates, Radford University, Organizing for the Ambiguity of Sustainability;
11:50 Peter Goering, Energy and Resources Group, UCB, Do Traditions, Sustainability, and International Economic Development Mesh? Insights from Ladakh;
12:05 Lori Ann Thrupp, University of California, Berkeley, Political Economy of the Sustainable Development Crusade: From Elite Protectionism to Social Justice.

4061. AAG Archives and Association History Committee and Cartography Specialty Group: The History and Development of Academic Cartography in the United States: 1920-1980. Wentworth.

Organizers: **Robert B. McMaster**, Syracuse University, **Martin S. Kenzer**, University of Southern California

Chair: **Norman J.W. Thrower**, UCLA

11:05 Norman J.W. Thrower, University of California, Los Angeles, **Robert B. McMaster**, Syracuse University, The Early Years of American Academic Cartography;

11:20 Arthur H. Robinson, University of Wisconsin, The Development of Cartography at Wisconsin;

11:35 George F. Jenks, University of Kansas, The Development of Cartography at Kansas;

11:50 John Sherman, University of Washington, The Development of Cartography at Washington.

Discussants: **Joel L. Morrison**, USGS/National Mapping Division, **Pat Gilmartin**, University of South Carolina, **Eugene J. Turner**, California State University, Northridge.

4062. Regional Development and Planning and Socialist Geography Specialty Groups: Radical Perspectives of the Global Village. Kenora.

Organizer: **Bryan Higgins**, State University of New York

Chair: **Bryan Higgins**, State University of New York

11:05 Byron Miller, University of Minnesota, Habermas, Modernity and Critical Human Geography;

11:25 Bryan Higgins, State University of New York, A Revolution in Development Theory: From Space to Place;

11:45 Rod Burgess, Johns Hopkins University, Third World Housing Policies and Development Strategies in the Postwar Period;

12:05 Gwyn Rowley, University of Sheffield, Fieldwork in Human Geography: Perspectives and Prospects.

4063. Mathematical Models and Quantitative Methods Specialty Group: Sharing the Global Village. Kent.

Organizer: **Grant Ian Thrall**, University of Florida-Gainesville

Chair: **Grant Ian Thrall**, University of Florida-Gainesville

11:05 Brian J. L. Berry, University of Texas-Dallas, Interdependent Urbanization: Urbanward Migration and Global Interdependence Since the Mid-Nineteenth Century;

11:25 Henry Theil, University of Florida-Gainesville, Measuring World Inequality.

Discussant: **Grant Ian Thrall**, University of Florida-Gainesville.

4064. Remote Sensing Specialty Group: Applied Remote Sensing I. Dufferin.

Organizer: **Kevin P. Price**, University of Kansas

Chair: **James W. Merchant**, University of Nebraska-Lincoln

11:05 Donald C. Rundquist, University of Nebraska-Lincoln, **J. Schalles**, Creighton University, **J. DeNoyelles**, University of Kansas, **D. Goodin**, University of Nebraska, **B. Hayes**, Creighton University, **M. Schlemmer**, University of Nebraska, **P. Yamamoto**, University of Nebraska, Close-Range Multispectral Remote Sensing of Turbidity and Chlorophyll Conditions in Manmade Ponds;

11:25 Mark E. Jakubauskas, University of Kansas, Thematic Mapper Assessment of Potential Kirtland Warbler Habitat;

11:45 Mary E. Dillworth, University of Kansas, Computer-Aided Mapping of Landscape Regions Using Landsat MSS Data;

12:05 James W. Merchant, University of Nebraska-Lincoln, An Expert Systems Approach to Updating Land Use/Land Cover Maps;

12:25 William A. Tyler, Environmental Research Institute of Michigan, **Robert H. Dye**, Environmental Research Institute of Michigan, Automatic Elevation Extraction from SPOT Panchromatic Images.

4065. Biogeography and Climate Specialty Groups: The Gaia Hypothesis: A Global System Theory I. City Hall.

Organizer: **Lee Klinger**, National Center for Atmospheric Research

Chair: **Lee Klinger**, National Center for Atmospheric Research

11:05 James E. Lovelock, GAIA, The Gaia Hypothesis;

11:25 F. Kenneth Hare, University of Toronto and Trent University, Reflections on the Climates of the Geological Past;

11:45 Connie Barlow, ARTA, Inc., Open Systems Living in a Closed Biosphere: A New Paradox for the Gaia Debate.

Discussant: **Lee Klinger**, National Center for Atmospheric Research.

4066. Soviet and East European Specialty Group: USSR: City and Country in the Soviet Union: Structural, Service, and Developmental Issues. Conference C.

Organizer: **Robert Gohstand**, California State University-Northridge

Chair: **Ellen K. Cromley**, University of Connecticut

11:05 Ihor Stebelsky, University of Windsor, Restructuring Soviet Agriculture: Towards a Spatial Dimension;

11:25 Thomas Maraffa, Youngstown State University, **Matthew Sagers**, Bureau of the Census, The Spatial Structure of Air Passenger Service for Kiev and Tashkent;

11:45 Mikaella Kagan, Moscow and Moscow Region: Territorial Conflicts;

12:05 Robert Gohstand, California State University, The Status of Urban Services Under Perestroyka: Preliminary Observations.

Discussant: **David J.M. Hooson**, University of California, Berkeley.

4067. Climate Specialty Group: Synoptic Climatology II: Classification Techniques and Applications. Conference D.

Organizers: **Julie A. Winkler**, Michigan State University, **Robert E. Davis**, University of Virginia

Chair: **Julie A. Winkler**, Michigan State University

11:05 Robert E. Davis, University of Virginia, **David R. Legates**, University of Oklahoma, The Impact of Short-term Weather Events Upon Long-term Visibility Changes;

11:25 Jeffery C. Rogers, The Ohio State University, Synoptic Variability Associated with Sea Level Pressure Teleconnections;

11:45 Scott R. Webber, University of Delaware, An Index of Planetary Wave Patterns for the Evaluation of Climate;

12:05 Andrew C. Comrie, Pennsylvania State University, **Brent Yarnal**, Pennsylvania State University, A Comparison of Synoptic Climatological Classification Schemes;

12:25 Andrew M. Carleton, Indiana University, **Mark J. Fitch**, Indiana University, Antarctic Meso-Cyclone Regimes from Satellite and Conventional Data.

4068. Regions Across the Global Village I: The Role of Regional Geography. Conference E.

Organizer: **Kathleen Braden**, Seattle Pacific University

Chair: **A. Richard Longwell**, Western Illinois University

Michael J. Bradshaw, University of Birmingham;
Rickie Sanders, Temple University;
David Dickason, Western Michigan University;
W.A. Douglas Jackson, University of Washington;
Mei-Ling Hsu, University of Minnesota;
William E. Doolittle, University of Texas.

4069. Transnational Corporations in Asian and Latin American Development: India, Singapore and Brazil. Oxford.

Organizer: **P.P. Karan**, University of Kentucky

Chair: **James R. Wilson**, University of Cincinnati

11:05 Raja Banerji, University of Kentucky, Indian Multinationals in Asia: Geography & Industry Patterns;

11:25 John R. Lombard, Moran, Stahl & Boyer, Inc., Foreign Direct Investment in Producer Services and the Development of the Singapore Economy;

11:45 James R. Wilson, University of Cincinnati, The Role of a Multinational Enterprise in Development in Brazil 1968-1978.

Discussants: **P.P. Karan**, University of Kentucky, **Cotton Mather**, New Mexico Geographical Society.

4070. North American Agriculture II. Carlton.

Chair: **Christopher R. Bryant**, University of Waterloo

11:05 William H. Wallace, University of New Hampshire, An Agricultural Renaissance in New England?;

11:25 Frank A. Erickson, Kent State University, Agricultural Land Conversion in an Urbanized Region-Northeast Ohio;

11:45 Henry W. Lawrence, Western Michigan University, Regional Patterns of Change in Commercial Small Farms in Metropolitan Areas;

12:05 Deborah L. Elliott-Fisk, University of California, Davis, A Comparison of the Viticultural Concept of "Terroir" Between Bordeaux and the Napa Valley: Legal Aspects, Viticultural Significance, Wine Implication;

12:25 Michael Martin, Oregon State University, **Gil Latz**, Portland State University, Implications of the US-Canada Free Trade Agreement for Agriculture in Western Oregon.

4071. Retail Geography. Simcoe.

Chair: **Ken G. Jones**, Ryerson Polytechnical Institute

11:05 Jo Foord, Polytechnic of North London, **Sophie Bowlby**, University of Reading, Changing Organization of Retailer-Supplier Relationships: Locational and Employment Implications;

11:25 Alan G. Hallsworth, Portsmouth Polytechnic, UK, Planning for Regional Shopping Centres: Contrasting Canada and the UK;

11:45 Justin C. Friberg, Old Dominion University, The Supermarket Setting in the Geography of Everyday Life;

12:05 David P. Brennan, College of St. Thomas, Retail Agglomerations: Suburban Retail Evolution in Minneapolis-St. Paul;

12:25 William J. Lloyd, California State University, Fullerton, Economic Planning and Retail Structure in Metropolitan Los Angeles.

4072. Glacial and Periglacial Geomorphology II. Civic Ballroom.

Chair: **Brian Hanson**, University of Delaware

11:05 Wakefield Dort Jr., University of Kansas, Drainage Around Margins of Early and Middle Pleistocene Continental Ice Sheets on the Great Plains;

11:25 Mark Francek, Central Michigan University, Proglacial Lake Modification of the New York Drumlin Field;

11:45 J. Ross Mackay, University of British Columbia, A Full Scale Field Experiment on the Growth of Permafrost, Western Arctic Coast, Canada;

12:05 Scott A. Lecce, University of Wisconsin, Madison, Hydroglaciology of Conness Glacier, California;

12:25 Brian Hanson, University of Delaware, Basal Sliding in a Three-dimensional Model of Storglaciaren, Sweden.

4073. Coastal and Marine Processes and the Influence of Human Impact. Grand Ballroom West, Section Z.

Chair: **Brian Greenwood**, University of Toronto

11:05 Vishwas Kale, University of Poona, **Anita Awasthi**, University of Poona, Morphology and Origin of Armored Mud Balls on Revadanda Beach (India);

11:25 William J. Reynolds, US Military Academy, Sediment Transport Across a Pacific Fringing Reef;

11:45 Mark S. Warren, University of Oklahoma, **Gregory A. Plumb**, University of Oklahoma, Estimating and Analyzing Error in Digital Monitoring of Shoreline Change;

12:05 Gerald H. Krausse, University of Rhode Island, Narragansett Bay, Rhode Island: The Urbanization of an Upper Estuary.

4074. Population Specialty Group: Major Directions in Population Geography: Annual Lecture and Commentary. Cinema II.

Organizer: **Kevin E. McHugh**, Arizona State University

Chair: **Kevin E. McHugh**, Arizona State University

11:05 Richard Morrill, University of Washington, On the Persistence of Regional Demographic Variability in the United States.

Discussants: **William A.V. Clark**, University of California, Los Angeles, **Eric G. Moore**, Queen's University, **David A. Plane**, University of Arizona.

4075. Landscape and Culture. Spin Drift (4th floor)

Chair: **James E. Pickett**, Towson State University

11:05 Margaret Bear, Boston University, Attitudes Toward Local Public Footpaths in Glastonbury, Somerset, England;

11:25 Peter L. Russell, University of Oregon, Another Roadside Attraction: The Cultural Topography of Oregon's Highway 99;

11:45 Douglas K. Meyer, Eastern Illinois University, Spatial Structures and Visual Elements of a German Common Landscape;

12:05 James E. Pickett, Towson State University, Smith Island, Maryland and Virginia: A Cultural/Historical Geography;

12:25 James M. Mayo, University of Kansas, From General Store to Grocery Store: Spatial Design in the American Shopkeeper Age.

12:30 pm to 2:00 pm

4076. Departmental Assistant Support Group Luncheon. Executive Suite (4th floor).

Organizer: **Carolyn Perry**, Portland State University

1:00 pm to 3:00 pm

4077. Specialty Group Chairs Luncheon. Redwoods Restaurant.

1:30 pm to 3:30 pm

4078. Field Trip 16C: Teacher Field Trips: Voice from the Past.

Organizer: **Lorraine Clarkson**, Toronto Urban Studies Centre/Board of Education

1:45 pm to 3:25 pm

4079. Water Resources Specialty Group: Floodplain Management in North America: National Programs, Regional Applications. Grand Ballroom Centre.

Organizer: **Frank Quinn**, Inland Waters Directorate, Environment Canada

Chair: **Frank Quinn**, Inland Waters Directorate, Environment Canada

1:45 R. Bruce MacLock, Alberta Environment, The Canada - Alberta Flood Damage Reduction Program;

2:05 K.W. Thomson, Grand River Conservation Authority, Canadian Flood Plain Management: Scale and Effectiveness;

2:25 Gerald E. Galloway, United States Military Academy, US Floodplain Management: A Complex, Cooperative Venture;

2:45 Eve Gruntfest, University of Colorado, Colorado Springs, Flash Flooding in the United States: Toward a Comprehensive Assessment.

4080. Historical Geography and Geographic Perspectives on Women Specialty Groups: Sharing the Continent: Women and Men in Western North America. Grand Ballroom East.

Organizers: **Jeanne Kay**, University of Nebraska-Lincoln, **Janice Monk**, University of Arizona

Chair: **R. Cole Harris**, University of British Columbia

Sylvia Van Kirk, University of Toronto;
Janet Henshall Momsen, University of Newcastle upon Tyne;
Jeanne Kay, University of Nebraska-Lincoln;

Discussants: **Arthur J.(Skip) Ray**, University of British Columbia, **David Wishart**, University of Nebraska.

4081. Geography of the Bible Specialty Group: Historical, Cultural and Philosophical Thought. Peel.

Organizer: **Bruce R. Crew**, University of Wisconsin-Milwaukee

Chair: **Bruce R. Crew**, University of Wisconsin-Milwaukee

1:45 Barry J. Beitzel, Trinity Evangelical Divinity School, The VIA MARIS in Literary and Cartographic Sources;
2:05 Karel Bayer, University of Wisconsin-Milwaukee, The Bible and the Spread and Perpetuation of Christian Monasticism II: Contemplation and Formation of the Church;
2:25 Bruce R. Crew, University of Wisconsin-Milwaukee, The Nabatean Geographical Domain During Inter-Testamental/New Testament Times;
2:45 Jonathan J. Lu, University of Northern Iowa, Tragedies on Mt. Gilboa.

4082. Population Specialty Group: The Escalating Refugee Crisis: Global and Regional Patterns. Cinema II.

Organizer: **Martin S. Kenzer**, University of Southern California

Chair: **Michael J. Broadway**, State University of New York at Geneseo

1:45 Nurit Kliot, University of Haifa, Borderlands as "Refugeeland" - Political Geographical Implications;
2:05 John C. Everitt, Brandon University, Refugees on Mainland Middle America: Moving Towards Solutions?;
2:25 Martin S. Kenzer, University of Southern California, The African Refugee Crisis: The Long and Short of It;
2:45 Lubomyr Y. Luciuk, Queen's University, A Landscape of Despair: Comments on the Geography of the Contemporary Afghan Refugee Experience;
3:05 Cheri Ragaz, University of Zurich, Indigenous Refugees: A Global Quest for Justice.

4083. Geography in Higher Education Specialty Group: The "New" School Geography: A Critique. Grand Ballroom West, Section X.

Organizers: **Robert A. Harper**, Professor Emeritus, University of Maryland

Chair: **W. Randy Smith**, Ohio State University

Richard Boehm, Southwest Texas State University;
Robert A. Harper, Professor Emeritus, University of Maryland;
A. David Hill, University of Colorado, Boulder;
Theodore H. Schmudde, University of Tennessee;
Tom L. McKnight, University of California, Los Angeles;

4084. GIS Specialty Group: NSF-NCGIA II: Expectations and Impressions of NCGIA Research Progress and Impact. Windsor East.

Organizer: **Barry Wellar**, University of Ottawa

Chair: **Joel L. Morrison**, USGS/National Mapping Division

Barry Wellar, University of Ottawa;
Kingsley E. Haynes, Boston University;
Jerome E. Dobson, Oak Ridge National Laboratory;
William J. Craig, University of Minnesota;
Richard Morrill, University of Washington;
Robert T. Aangeenbrug, University of South Florida;

4085. Rural Development, Canadian, Energy and Environment and Recreation, Tourism and Sports Specialty Groups: Global Linkages in Regional Development : Comparative European-North American Perspectives B. VIP Room.

Organizers: **Ole Gade**, Appalachian State University, **Vincent P. Miller**, Indiana University of Pennsylvania

Chair: **Ulf Wiberg**, University of Umea Centre for Regional Science

1:45 Erik Bylund, Umea University, Top-Down or Bottom-Up Planning in Swedish Planning Legislation and Practice;
2:05 Gerhard Gustafsson, University of Karlstad, The Importance of Landscape for Regional Development;
2:25 Micheal O'Cinneide, University College Galway, Diversifying the Rural Economy - Some European Experiences;
2:45 Ole Gade, Appalachian State University, Dealing with Disparities in Regional Development: The Intermediate Economic Development Region;
3:05 Jane Chang, Appalachian State University, **Jeff A. Jones**, Appalachian State University, The Intermediate Economic Development Region: A North Carolina Case Study.

4086. Socialist Geography Specialty Group: The Caribbean Under Global Restructuring. York.

Organizer: **Dennis Conway**, Indiana University, Bloomington

Chair: **Thomas D. Boswell**, University of Miami

1:45 Paul Susman, Bucknell University, Puerto Rico: Losing Ground in the Caribbean;
2:05 Susan Roberts, Syracuse University, Going Offshore: Finance and Development in the Caribbean;
2:25 Thomas C. Klak, The Ohio State University, Low Income Housing Policy in Jamaica: The Roles of State Agencies and U.S.A.I.D.
2:45 Dennis Conway, Indiana University, Bloomington, Emigration: The Caribbean Alternative to Economic Hardship and Economic Mismanagement Under Restructuring.

Discussant: **Gerald A. Thomas**, University of Kentucky.

4087. Contemporary Agriculture and Rural Land Use Specialty Group: Restructuring Rural Land Use I: Diversification. Carlton.

Organizers: **Janel M. Curry-Roper**, Central College, **Darrell Napton**, Southwest Texas State University

Chair: **Janel M. Curry-Roper**, Central College

1:45 Darrell Napton, Southwest Texas State University, Institutionally Promoted Agricultural Diversification in Texas;
2:05 Charles Kovacik, University of South Carolina, **Roy S. Stine**, University of South Carolina, Quail Hunting as an Alternate Rural Land Use in South Carolina;
2:25 Andrew W. Gilg, University of Exeter, **Andrew Griffiths**, University of Exeter, Farm Level Responses to Changes in the Common Agricultural Policy: A Report on Three Studies in South West England;
2:45 Brian Ilbery, Coventry Polytechnic, Supply Control Measures and Farm Diversification in Britain;
3:05 Pierre DesLauriers, University of Montreal, **Claude Marois**, Universite de Montreal, **Christopher R. Bryant**, University of Waterloo, Diversification Strategies in the Rural-Urban Fringe South of Montreal.

4088. Urban Geography Specialty Group: Value and Change in the Built Environment. Essex.

Organizer: **Robert A. Beauregard**, Rutgers University

Chair: **Robert A. Beauregard**, Rutgers University

1:45 Helga Leitner, University of Minnesota, Urban Office Market Dynamics: National Cycles and Local Trajectories;

2:05 **Robert A. Beauregard**, Rutgers University, Urban Decline, Suburbanization and Investment in the Built Environment: Postwar Philadelphia;
2:25 **Anne Haila**, Academy of Finland, Speculative Investments in the Built Environment: The Case of Real Estate Investment Funds.
Discussant: **Neil Smith**, Rutgers University.

4089. Cultural Ecology and Socialist Geography Specialty Groups: Ecopolitical Economy of Underdevelopment II. Windsor West.
Organizers: **Lakshman S. Yapa**, Pennsylvania State University, **Ben Wisner**, Hampshire College
Chair: **Wilbur Zelinsky**, Pennsylvania State University
1:45 **Diana M. Liverman**, Pennsylvania State University, Some Recent Analyses of the Political Economy of Environmental Change in Mexico: A Commentary;
2:05 **Robert E. Maguire**, Inter-American Foundation, Empowerment and Innovation at the Grassroots: Haiti's Emerging Peasant Movement;
2:25 **Lakshman S. Yapa**, Pennsylvania State University, Social Theorizing of Community Empowerment.
Discussants: **Dianne Rocheleau**, Clark University, **Eric Sheppard**, University of Minnesota.

4090. Energy and Environment Specialty Group: International Perspectives on Global Warming. Dominion South.
Organizer: **Susan Macey**, Southwest Texas State University
Chair: **Marilyn Brown**, Oak Ridge National Laboratory
1:45 **Richard H. Hosler**, University of Pennsylvania, **Mark Bernstein**, University of Pennsylvania, Economic Growth, Regional Cooperation and CO_2 Emissions in Central America;
2:05 **Thomas J. Wilbanks**, Oak Ridge National Laboratory, Responses by Developing Countries to Global Warming;
2:25 **Barry D. Solomon**, US Environmental Protection Agency, **Dilip Ahuja**, The Bruce Company, An Equitable Approach to International Reduction of Greenhouse Gas Emissions;
2:45 **Mark A. Withers**, University of California, Los Angeles, Climatic Change and Tropical Moist Forests.
Discussant: **William Riebsame**, University of Colorado.

4091. Hazards, Cultural Ecology, Water Resources, Energy and Environment, Historical Specialty Groups: Crisis Zones and Global Environmental Change: Theory and Application II. Dominion North.
Organizer: **B. L. Turner**, Clark University
Chair: **Roger Kasperson**, Clark University
1:45 **B. L. Turner**, Clark University, Human Driving Forces of Global Environmental Change;
2:05 **Robert C. Mitchell**, Clark University, **Carl Wilmsen**, Clark University, Perception of and Concern about Environmental Change;
2:25 **Dominic Golding**, Clark University, **Roger Kasperson**, Clark University, **Samuel J. Ratick**, CENTED, Clark University, The Societal Management of Environmental Change.
2:45 **Galina V. Sdasyuk**, Institute of Geography, USSR Academy of Sciences, Landscape Dynamics and Environmental Degradation.
Discussant: **Lawrence S. Grossman**, Virginia Tech.

4092. AAG Archives and Association History Committee and Climate Specialty Group: History of Climatology I. Wentworth.
Organizers: **Robert A. Muller**, Louisiana State University, **Martin S. Kenzer**, University of Southern California
Chair: **Robert A. Muller**, Louisiana State University
1:45 **Anthony J. Brazel**, Arizona State University, Physical and Boundary Layer Climatology;
2:05 **John N. Rayner**, The Ohio State University, **Jay S. Hobgood**, The Ohio State University, **David A. Howarth**, University of Louisville, History of Dynamic Climatology;
2:25 **Wayne M. Wendland**, Illinois State Water Survey, Paleoclimates;
2:45 **Jay R. Harman**, Michigan State University, **Julie A. Winkler**, Michigan State University, Synoptic Climatology: Themes, Applications, and Prospects.

4093. Regional Development and Planning Specialty Group: European Planning and Urban Development Issues After 1992. Kenora.
Organizer: **Rodger K. Menzies**, US Army Corps of Engineers
Chair: **Ashok K. Dutt**, University of Akron
Peter Hall, University of California at Berkeley;
Marc DeSmidt, University of Utrecht;
Stanislaw Otok, Kent State University.

4094. Industrial Geography Specialty Group: Institutional Conditions of Economic Development. Huron.
Organizer: **Nancy Ettlinger**, Ohio State University
Chair: **Dave R. Reynolds**, University of Iowa
1:45 **David R. Meyer**, Brown University, Regional Agricultural Development and Urban-Industrial Growth: The Institutional Context;
2:10 **Nancy Ettlinger**, Ohio State University, An Historical and Comparative Assessment of Economic Development in California and Japan;
2:35 **Martin Hynes**, The Ohio State University, Competitive Advantage and National Economic Performance.
Discussant: **James W. Harrington**, University at Buffalo.

4095. Asian Specialty Group (Southeast Asia Division): Session III: Southeast Asia: Land Use and Agriculture. Simcoe.
Organizer: **Thomas R. Leinbach**, University of Kentucky
Chair: **Richard Ulack**, University of Kentucky
1:45 **James Schweithelm**, University of Hawaii, Watershed Land Use and Coastal Sedimentation: Citanduy/Segara Anakan System;
2:05 **Michael Moss**, University of Guelph, The Evaluation and Use of Land Resource Data for Regional Development in Sulawesi, Indonesia.
Discussant: **Richard Ulack**, University of Kentucky.

4096. Remote Sensing Specialty Group: Applied Remote Sensing II. Dufferin.
Organizer: **Kevin P. Price**, University of Kansas
Chair: **Janet Franklin**, San Diego State University
1:45 **Sally J. Westmoreland**, San Diego State University, **Douglas A. Stow**, San Diego State University, Updating Land Use Coverage in a GIS Using Remotely Sensed Data;
2:05 **Debbie Turner**, San Diego State University, **Janet Franklin**, San Diego State University, Canopy Reflectance Modelling of Semiarid Shrub Vegetation;
2:25 **Allen S. Hope**, San Diego State University, Estimating Biophysical Quantities Using Remotely Sensed Spectral Vegetation Indices: Selected Case Studies;
2:45 **Donald E. Luman**, Northern Illinois University, The Use of SPOT and Landsat to Substantiate a Proposed Regrouping of the National Wetlands Inventory;
3:05 **Lawrence R. Handley**, US Fish and Wildlife Service, Evaluation of Photographic Scales and Wetland Classification Using a GIS Analysis of Lower San Francisco Bay.

4097. Cultural Ecology and Cultural Geography Specialty Groups: Steps in a Journey Toward Nature-Society Theory — On Theory in Cultural Ecology. Civic Ballroom.

Organizer: **Cindi R. Katz**, City University of New York
Chair: **Cindi R. Katz**, City University of New York
1:45 **Philip W. Porter**, University of Minnesota, Searches for Social Theory in Geography and Geography in Social Theory;
2:05 **Cheri Ragaz**, University of Zurich, **Andrew Kirby**, University of Arizona, Tradition, Culture and Imposed Social and Environmental Change in Indonesia;
2:25 **Liz Bondi**, Edinburgh University, Landscapes of Change: Masculinity and Femininity in the City;
2:45 **Cindi R. Katz**, City University of New York, In the Nature of Things: The Environment and Everyday Life.
Discussant: **Margaret FitzSimmons**, UCLA

4098. Biogeography and Climate Specialty Groups: The Gaia Hypothesis: The Role of Terrestrial Systems in Gaian Regulation II. City Hall.
Organizer: **Lee Klinger**, National Center for Atmospheric Research
Chair: **Lee Klinger**, National Center for Atmospheric Research
1:45 **Samuel N. Goward**, University of Maryland, Evidence of a Unified Phytosphere: A Step Toward Gaia;
2:05 **Linda O. Mearns**, National Center for Atmospheric Research, **Filippo Giorgi**, National Center for Atmospheric Research, Regional Climate Modeling of the Great Lakes Basin and Climate Change Scenario Development for Impacts Assessment;
2:25 **Jennifer M. Robinson**, Pennsylvania State University, The Evolution of Land Plants: Evidence of Gaian Clumsiness? (The Need for Geophysiology);
2:45 **Lee Klinger**, National Center for Atmospheric Research, Peatland Formation and Ice Ages: A Possible Gaian Mechanism Related to Community Succession.

4099. Synoptic and Dynamic Controls on Northern Hemisphere Temperature Variability. Conference D.
Organizers: **Daniel J. Leathers**, University of Nebraska-Lincoln, **Kenneth F. Dewey**, University of Nebraska-Lincoln
Chairs: **Kenneth F. Dewey**, University of Nebraska-Lincoln, **Daniel J. Leathers**, University of Nebraska-Lincoln
1:45 **Mark F. Hartman**, University of Nebraska-Lincoln, Possible Periodicity in Summertime Maximum Temperatures at Sacramento, California;
2:05 **Joachim A. Schumacher**, University of Nebraska-Lincoln, Analysis of Daily Temperature Range Variations Over the United States;
2:25 **Kenneth F. Dewey**, University of Nebraska-Lincoln, A Climatology of Thermal Lags and Thermal Variability;
2:45 **Daniel J. Leathers**, University of Nebraska-Lincoln, Low-Frequency Mid-tropospheric Variations and North American Temperature Variability;
3:05 **Michael A. Palecki**, State University of New York at Buffalo, Mid-Tropospheric Teleconnections and Surface Temperature Variability in the Northern Hemisphere.

4100. Regions Across the Global Village II: Problems of Methodology. Conference E.
Organizer: **Kathleen Braden**, Seattle Pacific University
Chair: **Philip Micklin**, Western Michigan University
Thomas Rumney, State University of New York, Plattsburgh;
Johnathan Bascom, East Carolina University;
Bheru Sukhwal, University of Wisconsin-Platteville;
Nancy Fisher-Allison;
Clifton W. Pannell, University of Georgia;
Thomas D. Anderson, Bowling Green State University.

4101. Office of the Geographer, U.S. Department of State: Applying Political Geography to International Relations. Conference F.
Organizer: **William B. Wood**, Office of The Geographer
Chair: **William B. Wood**, Office of The Geographer
1:45 **William B. Wood**, Office of The Geographer, Tropical Deforestation: Regional Development or Global Threat?;
2:05 **Angela Tomaino**, US Department of State, Polar Politics;
2:25 **Phyllis Mofson**, US Department of State, Japan and the Global Environment: Attitudes and Policies;
2:45 **George J. Demko**, Dartmouth College, Ethnicity and Environment in the USSR: Polluting the People of Perestroyka.

4102. China Geography Specialty Group: China III: Population and Economic Development. Conference G.
Organizer: **C.P. Lo**, University of Georgia
Chair: **Gregory Veeck**, Louisiana State University
1:45 **Stanley Toops**, Old Dominion University, Programs for Development in Minority Ethnic Regions of China;
2:05 **Jessica P.L. Lee**, The Ohio State University, The Spatial Impact of Economic Development on Fertility in China;
2:25 **Ka-yan Chan**, University of Hong Kong, The "Blind Flow" of Population Into Guangzhou City;
2:45 **Jixian James Wang**, University of Toronto, **C.K. Leung**, University of Hong Kong, Optimization of Coal Transportation in China.

4103. Aging and the Aged Specialty Group: General Issues in Aging. Grand Ballroom West, Section Y.
Organizer: **Susan Macey**, Southwest Texas State University
Chair: **Susan Macey**, Southwest Texas State University
1:45 **Christopher A. Friel**, Western Illinois University, The Relationship of Elderly Concentrations, Transfer Payments, and Local Economic Base in Nonmetro Illinois;
2:05 **Judith W. Meyer**, University of Connecticut, **Ellen K. Cromley**, University of Connecticut, Nutrition Service Availability: A Potential Model;
2:25 **Paul A. Rollinson**, Southwest Missouri State University, The Spatial Activity of the Older Homeless Population;
2:45 **Geoffrey C. Smith**, University of Manitoba, Behavioral Constructs of Urban Elderly Consumers.
Discussant: **Stephen M. Golant**, University of Florida.

4104. Biogeography: General II. Norfolk.
Chair: **David W. Steadman**, New York State Museum
1:45 **Eileen M. O'Brien**, University of Oxford, Climate and Pattern in Africa's Plant Species Richness: Based on Analyses of Southern Africa's Native Woody Flora;
2:05 **Joseph Poracsky**, Portland State University, Inventorying Urban Natural Areas in Portland, Oregon;
2:25 **Susanna T.Y. Tong**, University of Cincinnati, **Pat M. Farrell**, University of Cincinnati, The Urban Forest as a Sink for Heavy Metal Particulates;
2:45 **Elizabeth Hobbs**, Macalester College, Urban Forest Patch Change, 1957-1980, in St. Paul, Minnesota;
3:05 **Peter H. Yaukey**, University of Georgia, The Distribution of Junco Races in Relation to Their Dominance.

4105. Third World Regional Development. Oxford.
Chair: **Roger A. Roberge**, University of Ottawa
1:45 **Arthur L. Silvers**, University of Arizona, **Marvin Waterstone**, University of Arizona, Future Brazilian Eco-Demographic Growth, Land Demand, and Deforestation in Amazonia;
2:05 **John DeWitt**, Radford University, The Manaus Free Trade Zone: Creating an Industrial Center in Amazonia;
2:25 **Baber A. Ghosheh**, Edinboro University, Lessons from Japanese Economic Development for the Arab World;
2:45 **Alexander Melamid**, New York University, Regionalisation, Centralisation and Autarchy in Economic Development:

Examples from Eastern Arabia and Elsewhere;

3:05 **Steven L. Driever**, University of Missouri-Kansas City, New Directions in the Caribbean Basin Initiative.

4106. Social and Cultural Dimensions of Neighborhood. Spin Drift (4th floor)

Chair: **Sherry Olson**, McGill University

1:45 **Harry L. Margulis**, Cleveland State University, **Verghese J. Chirayath**, John Carroll University, Chinatowns: Downtown Sanctuaries, Immigrant Asian Reception Areas and Festival Marketplaces;

2:05 **Martin Luymes**, University of Toronto, Residential Renovation and Neighbourhood Change in Toronto, 1972-1988;

2:25 **Adriaan Hoogvliet**, University of Utrecht, The Shifting Positions of Neighbourhoods in Dutch Cities;

2:45 **Stuart Simpson**, Virginia Polytechnic Institute & State University, Confederacy in Baltimore: A Case Against Fragmented Development Control;

3:05 **Kevin McCracken**, Macquarie University, Stability and Change in Territorial Social Well-Being in Sydney, Australia.

4107. Remote Sensing: Urban. Elgin.

Chair: **Kamlesh Lulla**, NASA/Johnson Space Center

1:45 **Philip J. Howarth**, University of Waterloo, **L. R. G. Martin**, University of Waterloo, **P. Gong**, University of Waterloo, **G. H. Holder**, University of Waterloo, Monitoring Land Use at the Rural-Urban Fringe of Metropolitan Toronto Using Spot Satellite Imagery;

2:05 **Barry Haack**, George Mason University, **Susan Jampoler**, George Mason University, SPOT Imagery for Urban-Rural Delineation: A Case Study;

2:25 **Charles Roberts**, Pennsylvania State University, **Robert Crane**, Pennsylvania State University, Urban Population Estimates Using Textural Analysis;

2:45 **Su-Chang Wang**, University of New Orleans, Multivariate Methods Comparison in the Digital Analysis of Urban Tree Communities.

3:05 **Tung Fung**, Chinese University of Hong Kong, Mapping Urban Expansion in a High Density Urban Area with Digital Remotely Sensed Data: A Case Study of Hong Kong.

4108. Hillslope and Mass Movement Processes. Conference B.

Chair: **David R. Butler**, University of Georgia

1:45 **Karl W. Birkeland**, Montana State University, **Katherine J. Hansen-Bristow**, Montana State University, **Robert L. Brown**, Montana State University, The Geographic Variability of Snow Strength in Potential Avalanche Slabs;

2:05 **Susan Brooks**, University of Cambridge, Mass Movement Processes on Slopes: The Role of Pedogenesis and Hydrological Changes Over Geological Timescales;

2:25 **John F. Shroder Jr.**, University of Nebraska-Omaha, Richard Marston, University of Wyoming, **James Schmitt**, Montana State University, Mass-Movement Sedimentation in Snake River Drainage Basin and Yellowstone Fires;

2:45 **Mary Skopec**, University of Iowa, Modelling of Fire Behavior in Steep Terrain;

3:05 **Scott E. Morris**, University of Idaho, **Greg A. Olyphant**, Indiana University, Threshold Identification Between Rock Glacier and Talus Facies, Indian Peaks, Colorado.

4109. Medical: Developed World Rural and Urban. Grand Ballroom West, Section Z.

Chair: **Ellen K. Cromley**, University of Connecticut

1:45 **L. Gary Hart**, University of Washington, **Roger A. Rosenblatt**, University of Washington, **Bruce A. Amundson**, University of Washington, Rural Hospital Utilization: Who Stays and Who Goes?;

2:05 **Jonathan D. Mayer**, University of Washington, **L. Gary Hart**, University of Washington, Why Do Some Rural Residents Leave Their Home Communities for Outpatient Visits?;

2:25 **Paul Knox**, Virginia Polytechnic Institute & State University, **J. Bohland**, Virginia Polytechnic Institute & State University, **L. Shumsky**, Virginia Polytechnic Institute & State University, Urban Change and the Origins of a Dual Health Care Delivery System;

2:45 **Frank Innes**, University of Windsor, **Therese Hutchinson**, University of Windsor, **Bette Catton**, Sandwich Community Health Centre, Geography and Community Health Center Development: A Windsor Case Study;

3:05 **Elizabeth L. Winegar**, Memphis State University, The Location of Obstetrician and Gynecologist Offices in Memphis, Tennessee, 1950-1988.

4110. Soviet and East European Specialty Group: USSR: Regional Differences and Regional Change. Conference C.

Organizer: **Robert Gohstand**, California State University-Northridge

Chair: **Andrew R. Bond**, V. H. Winston & Son, Inc.

1:45 **Richard H. Rowland**, California State University, San Bernardino, Economic Region Net Migration Patterns in the USSR: 1979-89;

2:05 **Pavel Ilyin**, Kennan Institute for Advanced Russian Studies, Regional Types of Urbanization in the USSR;

2:25 **Olga L. Medvedkov**, Wittenberg University, Social Inequality and Population Dynamics in the USSR: A Regional Portrait;

2:45 **Yuri V. Medvedkov**, The Ohio State University, Regional Geography of Backwardness in the Soviet Union.

Discussant: **Allan Rodgers**, Pennsylvania State University.

4111. Geomorphology Specialty Group: Soil Development During the Quaternary. Kent.

Organizer: **Randall J. Schaetzl**, Michigan State University

Chair: **Randall J. Schaetzl**, Michigan State University

1:45 **Roger H. King**, University of Western Ontario, Soil Development on a Sequence of Raised Beaches, Truelove Lowland, Devon Island, N.W.T., Canada;

2:05 **Linda Barrett**, Michigan State University, A Chronosequence of Soils on Lake Terraces in Northern Michigan;

2:25 **Paulette Falk**, University of Kansas, **Curt J. Sorenson**, University of Kansas, **Ed Bell II**, Computer Sciences Corporation, New Data Suggest Multiple Fills in the Buck Creek Terrace;

2:45 **Rolfe Mandel**, University of Nebraska at Omaha, Morphology of Holocene-Age Buried Paleosols Developed in Valley Fill of the Pawnee River, Southwestern Kansas;

3:05 **Peter M. Jacobs**, University of Wisconsin-Madison, Paleosols of the Oil City Interfluve, Upper Kickapoo Valley, Wisconsin.

1:45 pm to 4:15 pm

4112. Poster Session: Cultural, Historical, Population, Education. Sheraton Hall.

Diane Mulville-Friel, Western Illinois University, Location of Underground Petroleum Storage Tanks in Macomb, Illinois, 1910-1989: An Historical Geography;

John F. Watkins, University of Kentucky, **John T. Bowen Jr.**, University of Kentucky, **Thomas R. Leinbach**, University of Kentucky, Social and Structural Variations in Transmigration Survival Strategies: Some Illustrations from South Sumatra, Indonesia;

William Edward Arlinghaus, Michigan Document Services, **Andrea V. Arlinghaus**, University of Michigan, The Global Mouth: A Geo-phonetic Map;

Richard T. Lewis, Kent State University, Presbyterians in Akron, 1963-1989;

Shyam S. Bhatia, University of Wisconsin, Oshkosh, Changes in the Age and Sex Structure of India's Population, 1980-2020;

Kazimierz J. Zaniewski, University of Wisconsin-Oshkosh, Age and Sex Structure of Population in Eastern Europe;

Frank Barrett, York University, Schnurrer's Global Disease Map of 1827;

Andrea V. Arlinghaus, University of Michigan, The Geography of Beowulf: Fact or Fiction?;

Gary S. Freedom, McNeese State University, The Dismantling of US Army Forts on the Northern Great Plains, 1866-1891;

Eliza Husband, University of Illinois/Urbana-Champaign, American Social Conscience and Outmigration from New England Before the Civil War;

Ary J. Lamme III, University of Florida, Juxtaposed Elements in a Cultural Landscape: Carroll County MD;

Robert A. Sauder, University of New Orleans, John Wesley Powell's Vision of Arid Land Settlement Reexamined;

Kurt Schroeder, University of Minnesota-Duluth, Economic, Political, and Physical Geography of Military Conflict Simulations;

Mikels Skele, Southern Illinois University at Edwardsville, **William I. Woods**, Southern Illinois University at Edwardsville, A Historical Topographic Sequence in the Sele Plain, Campania, Italy;

Simon Baker, East Carolina University, Land Use and Cover on Aerial Photographs: USGS Classification;

Allen D. Bushong, University of South Carolina, The US Presence in Canadian Academic Geography;

Neal Lineback, Appalachian State University, Geography in the News, '89-90;

Joseph G. Spinelli, Bowling Green State University, **Bruce W. Smith**, Bowling Green State University, Patterns of College Recruitment in Ohio, 1982 and 1988;

Lorraine Guay, Universite Laval, The Empty Cemetery: Morphological Aspects of Cemetery Development in Quebec City;

Palmyra M. Leahy, East Carolina University, Migrant and Seasonal Farmworkers in Pitt County, North Carolina;

John Morgan, Emory and Henry College, The Cantilever Barn in Upper East Tennessee and Southwest Virginia.

3:40 pm to 5:20 pm

4113. International Trade. Dufferin.

Chair: **Christine M. Rodrigue**, CSU- Chico

3:40 David J. Hayward, Pennsylvania State University, **Rodney A. Erickson**, Pennsylvania State University, The International Flows of Industrial Exports from US Regions;

4:00 E. Willard Miller, The Pennsylvania State University, The Canadian-American Mineral Trade: Trends and Prospects;

4:20 Bidhan Chandra, State University of New York at Buffalo, Export-Orientation of Western New York Manufacturing Firms in the Chemical/Medical Supply Sectors in the Context of the Canada-US Free Trade Agreement;

4:40 John C. Hudson, Northwestern University, Changing Patterns in the North American Grain Trade.

4114. Bible Specialty Group: Business Meeting. Peel.

Chair: **Barry J. Beitzel**, Trinity Evangelical Divinity School

4115. Soviet and East European Specialty Group: USSR: Environmental and Health Issues. Conference C.

Organizer: **Robert Gohstand**, California State University-Northridge

Chair: **Ihor Stebelsky**, University of Windsor

3:40 Peter R. Craumer, Florida International University, **Ellen K. Cromley**, University of Connecticut, The Changing Geography of Higher Medical Education in the USSR;

4:00 Andrew R. Bond, V. H. Winston & Son, Inc., **Kurt Piepenburg**, Carthage College, Land Reclamation After Surface Mining in the USSR: Preliminary Observations;

4:20 Philip R. Pryde, San Diego State University, The Management of Toxic Wastes in the Soviet Union;

4:40 William A. Dando, Indiana State University, **James D. Schlichting**, Indiana State University, Russian-Soviet Urban Famines: Implications for a Future World of Mega-Cities.

Discussant: **Brenton M. Barr**, University of Calgary.

4116. Rural Development, Canadian, Energy and Environment and Recreation, Tourism and Sports Specialty Groups: Global Linkages in Regional Development: Comparative European-North American Perspectives C. VIP Room.

Organizers: **Ole Gade**, Appalachian State University, **Vincent P. Miller**, Indiana University of Pennsylvania

Chair: **Lawrence M. Sommers**, Michigan State University

Gerhard Gustafsson, University of Karlstad;

Gopal S. Kulkarni, Indiana University of Pennsylvania;

Micheal O'Cinneide, University College Galway;

Robert E. Reiman, Appalachian State University;

Ulf Wiberg, University of Umea Centre for Regional Science;

Gabriel Bladh, University of Karlstad;

Assefa Mehretu, Michigan State University.

4117. Political Geography Specialty Group: The New Europe: European Integration and Geographic Implications. York.

Organizers: **Rudi Hartmann**, University of Colorado, **Helga Leitner**, University of Minnesota

Chairs: **Rudi Hartmann**, University of Colorado, **Helga Leitner**, University of Minnesota

Ingeborg Toemmel, Catholic University of Nijwegen;

Ann M. Oberhauser, University of Toledo;

Josef Nipper, University of Cologne;

Gerald Romsa, University of Windsor;

Rudi Hartmann, University of Colorado.

4118. Contemporary Agriculture and Rural Land Use Specialty Group: Restructuring Rural Land Use II. Carlton.

Organizers: **Janel M. Curry-Roper**, Central College, **Darrell Napton**, Southwest Texas State University

Chair: **Darrell Napton**, Southwest Texas State University

3:40 Rita M. Kozak, University of Wisconsin-River Falls, Construction of Beltline Routes: Impacts on Rural Communities;

4:00 Timothy J. Rickard, Central Connecticut State University, **Peggy K. Parry**, Central Connecticut State University, Direct Marketing Fruit and Vegetables in Connecticut;

4:20 Lisa M. B. Harrington, Central Michigan University, Lands for Research: The Case of New Mexico;

4:40 Sent Visser, Southwest Texas State University, Farm Size and Distance to Market;

5:00 Richard Munton, University College London, Farming Families in Upland Britain: Options, Strategies and Futures.

4119. Urban Geography and Geographic Perspectives on Women SGs: Housing, Class, Gender. Windsor East.

Organizer: **Neil Smith**, Rutgers University

Chair: **Joanna Regulska**, Rutgers University

3:40 Laura Smethurst, University of Edinburgh, Mobility, Community and Class in Scottish Mining Settlements, 1870-1900;

4:00 Myrna M. Breitbart, Hampshire College, In Search of a Quality Urban Housing Environment for Women;

4:20 Lawrence Knopp, University of Minnesota, **Mickey Lauria**, University of New Orleans, Differences Between Gay and Non-Gay New Orleanians in the Production and Consumption of Gentrified Housing.

Discussant: **Joanna Regulska**, Rutgers University.

SATURDAY, APRIL 21

4120. Sharing the Transnational Rivers in Asia and North America: Cross-Cultural Comparisons: Indus, Ganges and Rio Grande. Windsor West.
Organizer: **P.P. Karan**, University of Kentucky
Chair: **P.P. Karan**, University of Kentucky
Bheru Sukhwal, University of Wisconsin-Platteville;
Cotton Mather, New Mexico Geographical Society;
P.P. Karan, University of Kentucky;

4121. Hazards, Cultural Ecology, Water Resources, Energy and Environment, and Historical Specialty Groups: Crisis Zones and Global Environmental Change: Case Studies. Dominion North.
Organizer: **B. L. Turner**, Clark University
Chair: **Samuel J. Ratick**, CENTED, Clark University
3:40 **William B. Meyer**, Clark University, The White Mountains, 1890-1920;
4:00 **Nigel J.H. Smith**, University of Florida, Amazonia;
4:20 **Vladimir M. Kotlyakov**, Institute of Geography, USSR Academy of Sciences, Problems of the Aral Region as a Zone of Ecological Crisis;
4:40 **Harold Brookfield**, Australian National University, Deforestation in Peninsular Malaysia and Borneo.
Discussant: **Carville Earle**, Louisiana State University.

4122. AAG Archives and Association History Committee and Climate SGs: History of Climatology II. Wentworth.
Organizers: **Robert A. Muller**, Louisiana State University, **Martin S. Kenzer**, University of Southern California
Chair: **Richard H. Skaggs**, University of Minnesota
3:40 **John R. Mather**, University of Delaware, History of Hydroclimatology;
4:00 **Laurence S. Kalkstein**, Environmental Protection Agency, Bioclimatology;
4:20 **John E. Oliver**, Indiana State University, Climatic Classification: History, Status and Future;
4:40 **Robert A. Muller**, Louisiana State University, Regional Climates and Climate Information Systems.

4123. Industrial Geography Specialty Group: Women, Services and Industrial Policy. Huron.
Organizers: **Julie Graham**, University of Massachusetts, **Susan Christopherson**, Cornell University
Chair: **Damaris Rose**, University of Quebec
Susan Christopherson, Cornell University;
Linda McDowell, The Open University;
Julie Graham, University of Massachusetts.

4124. NCGIA and GIS Specialty Group: NCGIA Core Curriculum Users Group. Kent.
Organizer: **Michael F. Goodchild**, Univ of California, SB
Chairs: **Michael F. Goodchild**, University of California-SB, **Karen Kemp**, University of California-Santa Barbara

4125. Historical Geography Specialty Group: Student Scholars in Historical Geography II. Grand Ballroom West, Section Z.
Organizer: **William K. Wyckoff**, Montana State University
Chair: **William K. Wyckoff**, Montana State University
3:40 **Daniel S. Allen**, University of Georgia, Capital Invested in the Georgia Urban Manufacturing Sector, 1860-1880: What My Mother Never Told Me;
4:05 **Darrell P. Kruger**, Louisiana State University, The Pietermaritzburg Voortrekker Burial Place: An Appraisal;
4:30 **Michael Hawkins**, University of Florida, Landscape Preservation at Antietam;
4:55 **Robert A. Ricklis**, University of Texas at Austin, The Structure of Non-Agricultural Coastal Adaptation: A Case from the Texas Gulf Coast.

4126. Biogeography and Climate Specialty Groups: The Gaia Hypothesis: Implications for Geography III. City Hall.
Organizer: **Lee Klinger**, National Center for Atmospheric Research
Chair: **Deborah W. Woodcock**, University of Missouri
3:40 **Stuart Semple**, Dalhousie University, Gaia Hypothesis and Geographical Education;
4:00 **Anthony Barton**, Dalhousie University, Geographical Changes Wrought by the Biota;
4:20 **Deborah W. Woodcock**, University of Missouri, Gaia: Theory, Proponents, and Reception by the Scientific Community.

4127. Geomorphology and Climate Specialty Groups: Role of Geomorphology and Paleoclimatology in Understanding Global Environmental Changes: Integrating Geomorphic Processes with Landform Evolution. Conference B.
Organizers: **Ronald I. Dorn**, Arizona State University, **John C. Dixon**, University of Arkansas
Chair: **Ronald I. Dorn**, Arizona State University
3:40 **John C. Dixon**, University of Arkansas, Soil Forming Processes and Quaternary Landscape Evolution in the Colorado Rocky Mountains;
4:00 **Donald L. Johnson**, University of Illinois-Urbana/Champaign, **Cindy Balek**, University of Illinois, Quaternary Polygenetic Landscapes: Discerning the Imprints of Climatic From Other, Nonclimatic Factors;
4:20 **Patricia McDowell**, University of Oregon, Present and Past Climatic and Hydrologic Contexts of Lunette/Playa Systems;
4:40 **Amalie Jo Orme**, California State University-Northridge, **Antony R. Orme**, University of California-Los Angeles, Barrier-Beach Genesis and Changing Water Levels: Evidence from Quaternary Lake Sediments;
5:00 **Ronald I. Dorn**, Arizona State University, Role of Surface Exposure Dating in Combining Process and Quaternary Geomorphology.

4128. GIS Specialty Group: Natural Language, User Interfaces and GIS. Conference E.
Organizer: **David M. Mark**, NCGIA
Chair: **Scott M. Freundschuh**, State University of New York at Buffalo
3:40 **Werner Kuhn**, NCGIA, The Visualization of Spatial Relations;
4:00 **Thomas R. Orf**, Kent State University, An Investigation of Spatial Terms within a University Campus;
4:20 **Matthew McGranaghan**, University of Hawaii, Toward an Icon-Based GIS Interface;
4:40 **Terrence Smith**, NCGIA, Architecture for Natural Language Interfaces for GIS.

4129. Population Specialty Group: Metropolitan and Non-Metropolitan Change. Conference F.
Organizer: **Thomas Kontuly**, University of Utah
Chair: **Thomas Kontuly**, University of Utah
3:40 **Richard L. Forstall**, US Bureau of the Census, Natural Change and Net Migration in the Growth of Individual Metropolitan Areas: 1950-1988;
4:00 **William H. Frey**, University of Michigan, Metropolitan and Central City Population Change: Beyond the Transition;
4:20 **Glenn V. Fuguitt**, University of Wisconsin-Madison, **Calvin L. Beale**, US Department of Agriculture, The Contribution of Migration and Natural Increase to the Nonmetropolitan Turnaround and its Reversal.

4130. Aging and the Aged Specialty Group: Elderly Migration and Population Aging. Grand Ballroom West, Section Y.
Organizer: **John F. Watkins**, University of Kentucky
Chair: **Kevin E. McHugh**, Arizona State University

3:40 Thomas O. Graff, University of Arkansas, **Robert F. Wiseman**, University of Kansas, Future Trends in the Migration of the Elderly;
4:00 Frederick A. Day, Southwest Texas State University, **Charles L. Jackson**, Southwest Texas State University, Military Retirement Migration in the U.S.;
4:20 Diane C. Cowper, Department of Veteran Affairs, A Look at Migration Patterns and Socio-Demographic Characteristics of the Mobile Elderly Veteran Population;
4:40 Lee J. Cuba, Wellesley College, A Second Home: Previous Place Experience and Destination Selection in Retirement Decision Making.

4131. Biogeography: Pacific Region. Norfolk.
Chair: **George P. Malanson**, University of Iowa
3:40 David W. Steadman, New York State Museum, Biogeography of Tongan Landbirds Before and After Human Impact;
4:00 Dominique Pahlavan, New York State Museum, **David W. Steadman**, New York State Museum, Historic Biogeography of the Native Pigeons and Doves of the Marquesas Islands;
4:20 Susanna McKnight, SUNY College of Environmental Science & Forestry, Japanese Serow: An Example of Wildlife Management Using Cartographic Analysis;
4:40 John F. O'Leary, San Diego State University, Comparative Patterns of Species Diversity in Mediterranean-Type Shrublands and Heathlands;
5:00 George P. Malanson, University of Iowa, **Walter E. Westman**, Lawrence Berkeley Laboratory, Modeling the Response of California Shrublands to Climate Change.

4132. Environmental Issues in the Third World. Oxford.
Chair: **David A. Iyegha**, Alabama State University
3:40 Wolf Roder, University of Cincinnati, Kainji Lake After 21 Years: A Problem in Causal Inference;
4:00 Rodney R. White, University of Toronto, Environmental Legislation and Enforcement: Case Studies from Malawi and Senegal;
4:20 Lance Salisbury, University of Iowa, The Political Economy of Desertification in Central Somalia;
4:40 Will D. Swearingen, Colgate University, Climatic Impacts on Development: Drought and Policy Changes in Morocco;
5:00 Michael S. Mitchell, University of Tennessee, Foreign Non-governmental Organizations and Nature Conservation in Belize.

4133. Geographical Perspectives on Native Americans. Simcoe.
Chair: **Paul Kariya**, Dept. of Indian Affairs & Northern Development
3:40 Robert A. Rundstrom, George Mason University, Toponymic Studies and Indigenous Cultures in the United States and Canada;
4:00 Nancy Torrieri, US Bureau of the Census, **Joan Greendeer-Lee**, US Bureau of the Census, Identifying the 1990 Census Geographic Areas for the American Indian;
4:20 Janice Haskett Hutchings, Indiana University of Indianapolis, Cultural Landscape of the Cherokee Nation in Oklahoma;
4:40 Martha A. Narey, Lowry Technical Training Center, Forced Migration and Environmental Dislocation: The Nez Perce;
5:00 Robert M. Bone, University of Saskatchewan, Air Commuting for Northern Natives: Real or Imagined Impact?.

4134. Africa Specialty Group: Business Meeting. Dominion South.
Chair: **Gordon E. Matzke**, Oregon State University

4135. Canadian Specialty Group: Business Meeting. Conference D.
Chair: **Thomas Rumney**, State University of New York, Plattsburgh

4136. China Specialty Group: Business Meeting. Conference G.
Chair: **C.P. Lo**, University of Georgia

4137. Coastal and Marine Specialty Group: Business Meeting. Essex.
Chair: **Douglas J. Sherman**, University of Southern California

4138. Geography in Higher Education Specialty Group: Business Meeting. Grand Ballroom West, Section X.
Chair: **W. Randy Smith**, Ohio State University

4139. Latin America Specialty Group: Business Meeting. Civic Ballroom.
Chair: **A. Richard Longwell**, Western Illinois University

4140. Mathematical Models and Quantitative Methods Specialty Group: Business Meeting. Grand Ballroom Centre.
Chair: **A. Stewart Fotheringham**, State University of New York at Buffalo

4141. Remote Sensing Specialty Group: Business Meeting. Grand Ballroom East.
Chair: **Kamlesh Lulla**, NASA/Johnson Space Center

4142. Socialist Specialty Group: Business Meeting. Kenora.
Chair: **Leyla Vural**, Rutgers University

4143. Tourism in a Changing World. Elgin.
Chair: **Peter E. Murphy**, University of Victoria
3:40 Mark T. Williams, University of Kentucky, Tourism and Dependency: Minorca's (Spain) International Airport;
4:00 Malcolm Anderson, Queen's University, Problems with Tourism Development in Canada's Eastern Arctic;
4:20 Gerald A. Thomas, University of Kentucky, Port-Playground: The Changing Symbolism of a Caribbean Urban Landscape;
4:40 Andrea M. O'Ferrall, Michigan State University, Tourism and Agriculture on the North Coast of the Dominican Republic;
5:00 Yoel Mansfeld, University of Haifa, Turbulent Security Environment and Variable Propensity to Travel-The Case of Israel 1948-1989.

5:30 pm to 6:30 pm

4144. AAG Annual Awards and Business Meeting. Dominion Ballroom.
Chair: **Saul B. Cohen**, Governor's School and Business Alliance

7:00 pm to 8:00 pm

4145. Pre-Banquet Reception. Grand Ballroom Lobby.

7:00 pm to 10:00 pm

4146. Workshop 7: Making of a Biblical Atlas. Elgin.
Organizer: **Jonathan J. Lu**, University of Northern Iowa
Barry J. Beitzel, Trinity Evangelical Divinity School;

8:00 pm to 10:30 pm

4147. AAG Annual Banquet. Grand Ballroom East.
Chair: **Saul B. Cohen**, Governor's School and Business Alliance
David Ward, University of Wisconsin, Madison, Social Reform, Social Surveys and the Discovery of the Modern City.

SUNDAY, APRIL 22

7:00 am to 9:00 am

5001. AAG Publications Committee. Executive Suite (4th floor)
Chair: **Donald G. Janelle**, University of Western Ontario

7:00 am to 2:00 pm

5002. Speaker Ready Room. Vide Checkroom (Lower Concourse).

7:15 am to 1:00 pm

5003. Local Arrangements/Press Office. Conference A.

7:40 am to 9:20 am

5004. Structural and Regional Geomorphology. Conference F.
Chair: **William C. Johnson**, University of Kansas
7:40 Basil Gomez, Indiana State University, Simon Allerton, University of East Anglia, Structural Geomorphology of Southeast Troodos, Cyprus;
8:00 Thomas E. Miller, Indiana State University, Geomorphology of Belize, Central America;
8:20 Dale J. Stevens, Brigham Young University, **Carl A. Horton**, University of Utah, Morphogenetic Factors of Natural Arch Development in Arches National Park, Utah;
8:40 Harold A. Winters, Michigan State University, **Richard L. Rieck**, Western Illinois University, Palimpsest Relationships in Adjacent but Different Terrains of Southern Michigan;
9:00 Dean G. Wilder, University of Wisconsin, La Crosse, **Robert Boszhardt**, University of Wisconsin, La Crosse, The Geoarchaeological Potential of the Lower La Crosse River Valley.

5005. Biogeography and Climate Specialty Groups: Paleoecology and Paleoclimatology of Northernmost North America. Essex.
Organizer: **Lisa Graumlich**, University of Arizona
Chair: **Lisa Graumlich**, University of Arizona
7:40 Patricia Anderson, University of Washington, Holocene History of Alaskan Boreal Forest: Edaphic and Climatic Factors;
8:00 Glen MacDonald, McMaster University, **K. A. Moser**, Queen's University, Paleoecological Evidence for Asynchronous Changes in the Mean Summer Position of the Arctic Front Over Western and Central Canada;
8:20 T. E. Irwin, University of Toronto, Basal Peat Dates in Eastern Canada and Maine.
Discussant: **Patrick J. Bartlein**, University of Oregon.

5006. Geo-Energy: Energy Dependence and National Security. Grand Ballroom West, Section Y.
Organizers: **Rolf Sternberg**, Montclair State College, Ragnar Lofstedt, Clark University
Chairs: **Rolf Sternberg**, Montclair State College, Ragnar Lofstedt, Clark University
7:40 Ragnar Lofstedt, Clark University, Energy Policy and Risk Perception-A Swedish Case Study;
8:00 Rolf Sternberg, Montclair State College, Rivers Without Boundaries: The La Plata Basin as a Dominant Energy Source;
8:20 Donald W. Jones, Oak Ridge National Laboratory, Energy Security for Development: How Much Energy Could Major Latin American Countries Consume by 2000?.
Discussants: **Marilyn A. Brown**, Oak Ridge National Laboratory; **Edward L. Hillsman**, Oak Ridge National Laboratory.

5007. Asian Specialty Group (Southeast Asia Division): Session IV: Southeast Asia: Urban and Economic Development. Grand Ballroom West, Section X.
Organizer: **Thomas R. Leinbach**, University of Kentucky
Chair: **Thomas R. Leinbach**, University of Kentucky
7:40 Antonia Hussey, California State University-Northridge, An Assessment of ASEAN;
8:00 Christopher A. Airriess, Ball State University, Resource-Based Industrialization Strategies: The Case of INALUM in North Sumatra, Indonesia;
8:20 William A. Withington, University of Kentucky, Urban Sumatra, Indonesia: Twenty-Five Years of Development;
8:40 James L. Cobban, Ohio University, The Housing Question and City Planning in Indonesia: 1900-1940.
Discussant: **William B. Wood**, Office of The Geographer.

5008. Rural Development Specialty Group: Donald Innis Memorial Session on the Status of Rural Development: Case Studies and Panel Discussion. VIP Room.
Organizer: **Paul Frederic**, University of Maine-Farmington
Chair: **Paul Frederic**, University of Maine-Farmington
7:40 Henry Moon, The University of Toledo, A Look at Geographical Approaches to US Rural Development;
8:00 Benjamin F. Howatt, University of Maine at Augusta, The Case for Micro-systems Analysis in Rural Regional Planning.
Rickie Sanders, Temple University;
Ole Gade, Appalachian State University;
Anne Meaney-Leckie, State University of New York-Geneseo;
Gigi Berardi, Loyola Marymount University;
Discussant: **Robert E. Ford**, Brigham Young University.

5009. Cultural Ecology and Geomorphology Specialty Groups: Human Modifications of the Soil Environment I. Conference B.
Organizers: **Timothy P. Beach**, University of Wisconsin, Eau Claire, **Nicholas P. Dunning**, University of Cincinnati
Chair: **Timothy P. Beach**, University of Wisconsin, Eau Claire
7:40 Peter D. diCenzo, University of Toronto, **Shiu-hung Luk**, University of Toronto, **Ming-ko Woo**, McMaster University, Soil Erosion and Land Management in the Granitic Regions of Guangdong Province, South China;
8:00 Nicholas P. Dunning, University of Cincinnati, Ancient Anthrosols of the Maya Lowlands;
8:20 William I. Woods, Southern Illinois University at Edwardsville, Soil Erosion and Stabilization: Implications for Prehistoric Settlement-Subsistence Relationships in the Puebla-Tlaxcala Basin of Mexico;
8:40 Philip J. Gersmehl, University of Minnesota, Management-Induced Changes in "Innate" Soil Erodibility.

5010. Geographers at the International Agricultural Research Centers: Research Results and Interdisciplinary Experiences I. Peel.
Organizer: **Abe Goldman**, University of Florida
Chair: **David J. Campbell**, Michigan State University
7:40 Judith Carney, University of California, Los Angeles, Geographers and Crop Development in International Agricultural Research Centers: Triticale and the International Maize and Wheat Improvement Centers;
8:00 Dianne Rocheleau, Clark University, Mapping Separate Realities and Futures Possible for Agricultural Innovation in Rural Landscapes;
8:20 Abe Goldman, University of Florida, Geographic Contributions to Understanding Indigenous Resource Management Systems.
Anthony Bebbington, Cambridge University;
Simon E. Carter, Centro Internacional de Agricultura Tropical;
James Delehanty, University of Wisconsin-Madison;
Discussant: **Nigel J.H. Smith**, University of Florida.

5011. Remote Sensing Specialty Group: Biophysical Remote Sensing in Mountain Environments. Grand Ballroom East.

Organizers: **Kevin P. Price**, University of Kansas, **Stephen J. Walsh**, University of North Carolina

Chairs: **Kevin P. Price**, University of Kansas, **Stephen J. Walsh**, University of North Carolina

7:40 Stephen J. Walsh, University of North Carolina, **David R. Butler**, University of Georgia, Topographic Impacts on Snow-Avalanche Path Characterization Through TM and Spot Digital Enhancement Techniques;

8:00 R. Douglas Ramsey, Utah State University, Modeling Topographic Effects on Remotely-Sensed Images in North Central Utah Aspen Forests;

8:20 Daniel G. Brown, University of North Carolina, Landsat TM Spectral Response Model of Sub-Alpine Lake Turbidity Using Archived Field Data;

8:40 Dan Cohan, Utah State University, **Kevin P. Price**, University of Kansas, Improvements of Land Cover Classifications Due to Removal of the Topographic Effect from Landsat Data.

5012. AAG Affirmative Action and Minority Status Committee: Summer Institute for Talented Minority Undergraduate Students. Oxford.

Organizers: **DeWitt Davis Jr.**, University of the District of Columbia, **Jeffrey Osleeb**, Hunter College

Chairs: **DeWitt Davis Jr.**, University of the District of Columbia, **Jeffrey Osleeb**, Hunter College

DeWitt Davis Jr., University of the District of Columbia;

Jeffrey Osleeb, Hunter College.

5013. Socialist Geography Specialty Group: Marxism, Post-Marxism and Human Geography I: Social and Political. Dominion South.

Organizers: **Eric Sheppard**, University of Minnesota, **Derek Gregory**, University of British Columbia

Chair: **Eric Sheppard**, University of Minnesota

7:40 Derek Gregory, University of British Columbia, Habermas and the Geography of Communicative Action;

8:00 Mickey Lauria, University of New Orleans, Theory and Method in Human Geography: Historical Materialism Says It All.

Discussant: **Vera Chouinard**, McMaster University.

5014. Latin America Specialty Group: Future Directions in Latin American Geographical Research I. Elgin.

Organizer: **Gary S. Elbow**, Texas Tech University

Chair: **Howard L. Gauthier**, The Ohio State University

Ernst Griffin, San Diego State University;

Richard Jones, University of Texas at San Antonio;

Victoria Lawson, University of Washington;

Joseph L. Scarpaci, Virginia Polytechnic Institute & State University.

5015. Energy and Environment Specialty Group: Waste Management: International Perspectives. Kenora.

Organizer: **Virginia W. Maclaren**, University of Toronto

Chair: **John W. Frazier**, State University of New York at Binghamton

7:40 Joseph B. Whitney, University of Toronto, Goats and Garbage in Khartoum, Sudan;

8:00 Virginia W. Maclaren, University of Toronto, **Christine Furedy**, York University, Source Separation of Municipal Solid Wastes: A Framework for Comparative Analysis;

8:20 G. Tomas Murauskas, University of Wisconsin, Stevens Point, Conflict Over the Trans-National Movement and Siting of Wastes;

8:40 Paul La Courreye, US Environmental Protection Agency, Site Assessment Under the Superfund Program: A Case Study;

9:00 L. Graham Smith, University of Western Ontario, Wasted Energy: The Victoria Hospital EFW Facility.

5016. Microcomputers Specialty Group: Geographic Software. Kent.

Organizer: **Robert Sechrist**, Indiana University of PA

Chair: **Robert Sechrist**, Indiana University of Pennsylvania

7:40 Mary Catherine Prante, University of Kansas, Grain Size: A Program to Aid Pedologic Particle Size Analysis;

7:55 Peter F. Fisher, Kent State University, Network Routing Using Search in an Artificial Intelligence Environment;

8:10 Scott Loomer, MicroConsultants, MicroCAM-MicroComputer Automated Mapping;

8:25 Michael Peterson, Image Mapping System, MacCHORO II;

8:40 James R. Taylor, US Statistics & IUP, Displaying TIGER Files Using IMAGE;

8:55 Robert D. Hayes, Jr., Indiana University of Pennsylvania, Volcanic Ashfall Simulation.

5017. Political Geography Specialty Group: Territory and Power I. Simcoe.

Organizers: **Barney Warf**, Kent State University, **Lynn A. Staeheli**, University of Colorado at Boulder

Chair: **Barney Warf**, Kent State University

7:40 James Eflin, University of South Florida, Social Power in the Production of Space;

8:00 Holly J. Myers-Jones, Towson State University, The Social Production of Economic Development in Southwest Virginia;

8:20 Donald Lyons, University of Colorado, The Intraurban Implications of Economic Restructuring;

8:40 Ray Bromley, State University of New York at Albany, Small City/Big Polity: Economic Development in US State Capitals.

Discussant: **John Mercer**, University of Victoria

5018. Cultural Geography Specialty Group: From Nature to Natural: Cultural Interpretations of the Natural World. Civic Ballroom.

Organizer: **Terence Young**, University of California, Los Angeles

Chair: **Terence Young**, University of California, Los Angeles

7:40 David J. Nemeth, University of Toledo, The Natural Villages of South Korea;

8:05 Patrick McGreevy, Boston University, The Place of Nature and the Nature of a Small Urban Place;

8:30 Terence Young, University of California, Los Angeles, The Nature of San Francisco: The Multiple Meanings of Golden Gate Park;

8:55 Patricia Kellner, University of California, Los Angeles, From the Pastoral to the Promethean: Giant Power in the Pacific Northwest and the Rhetoric of th Electrical Sublime.

5019. AAG Archives and Association History Committee and the Cultural Geography Specialty Group: Geography and the History of Science I. City Hall.

Organizers: **Mona Domosh**, San Diego State University, **Martin S. Kenzer**, University of Southern California

Chair: **Mona Domosh**, San Diego State University

7:40 Michael Heffernan, Loughborough University of Technology, Geography and the Structure of Academic Research in Nineteenth-Century France;

8:00 Felix F.S. Driver, University of London, Geographical Knowledge and the New Imperialism: H.M. Stanley and the Geographers;

8:20 Lance F. Howard, University of California, Los Angeles, The Latent Image of Art in Geography.
Discussant: **Martin S. Kenzer**, University of Southern California.

5020. Climate Specialty Group: Urban Climatology I. Conference D.
Organizer: **A. John Arnfield**, The Ohio State University
Chair: **A. John Arnfield**, The Ohio State University
7:40 Philip W. Suckling, University of Georgia, **Bruce K. Ferguson**, University of Georgia, Runoff-Precipitation Relationships for an Urbanizing Watershed in Atlanta, Georgia;
8:10 Sue Grimmond, Indiana University, **T.R. Oke**, University of British Columbia, An Evapotranspiration-Interception Model for Urban Areas;
8:40 Kenji Matsuura, University of Delaware, Climate and Domestic Energy Consumption.

5021. Spatial Problems,Regional Development and the Expansion Method I. Conference E.
Organizer: **C. Cindy Fan**, University of California, Los Angeles
Chair: **John Odland**, Indiana University
7:40 Edward J. Taaffe, The Ohio State University, **Emilio Casetti**, Ohio State University, The Model/Context Problem and the Expansion Method;
8:00 Shaul Krakover, Ben-Gurion University, **Richard Morrill**, University of Washington, Long Wave Spatial and Economic Interrelationships in Urban Development;
8:20 Jessie Poon, The Ohio State University, Economic Growth and Trade;
8:40 Steven M. Banks, Illinois State University, Petroleum Booms, Agriculture, and International Trade: An Analysis of the Nigerian Experience Using the Expansion Methodology.

5022. Urban Social Problems I. Windsor East.
Chair: **Mark Wilson**, Michigan State University
7:40 Ernest H. Wohlenberg, Indiana University, Changes in American Poverty Over Two Decades;
8:00 Mark Wilson, Michigan State University, The Sectoral Structure of Social Welfare Services Across Metropolitan Areas;
8:20 April Veness, University of Delaware, Victims and Opportunists: How Wilmington's Homeless Make Do and Make Over Their World;
8:40 Eugene D. Perle, Wayne State University, Redlining Reexamined;
9:00 Roman J. Hramiak, University of Western Ontario, The Aging and Transformation of Multi-family Housing in Toronto.

5023. The Geography of Sport: Challenges and Opportunities. York.
Chair: **Robert S. Dilley**, Lakehead University
7:40 Michael L. Kelsey, Kent State University, **Surinder M. Bhardwaj**, Kent State University, Sports Shrines and Secular Pilgrimages;
8:00 Sharon M. Thomas, North Adams State College, Public and Private Partnerships: A Case Study;
8:20 Brent R. Skeeter, Salisbury State University, The Climatically Optimal Major League Baseball Season in North America;
8:40 G. Molenaar, University of Utrecht, Developments in Using Public Services in the Randstad Holland;
9:00 Olof Moen, Gothenburg University, **Kent Persson**, Gothenburg University, The Distribution and Regional Variation of Sports Facilities in Sweden.

5024. Physical Processes and the Environment. Wentworth.
Chair: **Jasper L. Harris**, North Carolina Central University
7:40 Francheska N. Chalidze, Radio Liberty, Air Pollution in the Soviet Union;
8:00 David Greenland, University of Colorado at Boulder, **M.C. Silverstein**, University of Colorado at Boulder, Wet Acid Deposition in Colorado in the 1985 Hydrologic Year;
8:20 Micheal Stone, Wilfrid Laurier University, Effect of Particle Size and Sediment Geochemistry on Phosphate Adsorption;
8:40 Robert T. Pavlowsky, University of Wisconsin-Madison, **William H. Renwick**, University of Miami-Ohio, Effects of Extreme Climatic Conditions on Trace Metal Transport in Developed Basins;
9:00 Mark Welford, University of Illinois, Tributary Inputs as a Means of Terrace Formation.

5025. Industrial Restructuring. Huron.
Chair: **Howard A. Stafford**, University of Cincinnati
7:40 Allen J. Scott, University of California-Los Angeles, The Technopoles of Southern California;
8:00 William H. Berentsen, University of Connecticut, Urban or Exurban R&D Sites in Connecticut?;
8:20 Grant Emison, University of Toronto, The State and Industrial Restructuring: The Ontario Centre for Automotive Parts Technology (OCAPT) and the Canadian Auto Industry;
8:40 Simon Milne, McGill University, New Forms of Manufacturing and the Small Firm: The Case of the UK High Fidelity Audio Sector;
9:00 Mark R. Hafen, University of South Florida, The Spatial Implications of Restructuring in the Glass Container Industry.

5026. GIS Applications. Conference C.
Chair: **Bruce A. Ralston**, University of Tennessee
7:40 Shih-Lung Shaw, Florida Atlantic University, A GIS Application of Studying a Commuter Rail System;
8:00 Luisa M. Freeman, Freeman Research Resources, Status of GIS Utilization by Electric Utilities for Market Research;
8:20 Victor Goldsmith, Hunter College, **Keith Clarke**, Hunter College, **William Hansen**, Hunter College, **Henry Bokuniewicz**, Marine Science Research Center, SUNY-Stony Brook, Development of a GIS for Ocean Disposal of Dredged Sediment from New York Harbor;
8:40 Steven I. Gordon, Ohio State University, Impacts of GIS Information Loss on a Nonpoint Pollution Model;
9:00 Gregory A. Elmes, West Virginia University, **Charles Yuill**, West Virginia University, **Mark Twery**, USDA-Forest Service, Morgantown Station, A Hypercard Prototype of a Knowledge-based Geographic Information System.

5027. Education: Methods. Grand Ballroom West, Section Z.
Chair: **Jean Palmer-Moloney**, Colorado Mt.College/Summit H.S.
7:40 Ian A. Wright, Ontario Assoc. of Geographic & Environmental Ed., Changes to the Ontario Geography Curriculum;
8:00 A. David Hill, University of Colorado, Boulder, **James M. Dunn**, University of Colorado, Translating the Discipline for Education: A Program to Develop Precollegiate Instructional Materials;
8:20 Richard Kujawa, University of Iowa/University of Maine, Farmington, "Give Me Half a Page on..." Writing as a Means Not an End in Human Geography Courses;
8:40 William F. Keinath Jr., University of Central Arkansas, Teaching GIB - Geography of International Business - as General Education;
9:00 Russell L. Dodson, Mansfield University, Bryon D. Middlekauff, Plymouth State College, Conducting a Successful Extended Field Experience in Physical Geography.

5028. Ethno Agriculture. Carlton.
Chair: **Thomas E. Downing**, University of Birmingham
7:40 Robert Brinkman, University of Wisconsin-Milwaukee, Salinity in Ancient Agricultural Anthrosols of South Arabia;
8:00 Robert A. Voeks, California State University-Fullerton, The Roots of Brazilian Candomble: Diffusion of Yoruba Ethnobotany;
8:20 Edward C. Britton, Louisiana State University, Survey of Haitian Root and Tuber Crops: Cultural Lineage, Future Potential;
8:40 Martha Jean Ferrill, Northern Michigan University, Horticultural Society Notes on Tree Planting on the Plains, 1872-1902;
9:00 Brian Murton, University of Hawaii, Sustainable Agricultural Development in Indian Historical Context.

5029. Historical Geography Specialty Group: Student Scholars in Historical Geography III. Grand Ballroom Centre.
Organizer: **William K. Wyckoff**, Montana State University
Chair: **William K. Wyckoff**, Montana State University
7:40 Timothy G. Anderson, Texas A&M University, Settlement Patterns and Chain Migration: Evidence of Cultural Transfer in a Missouri German Community, 1837-1981;
8:05 Daniel Clayton, University of British Columbia, Places Invent Their Makers: Three Settlements in Northern British Columbia, 1830-1900;
8:30 Robert E. Veselka, University of Texas at Austin, Courthouse Squares of Texas and the Symbolic Sense of Place;
8:55 Marie Daly Price, Syracuse University, Hands for the Coffee: Migration into Western Venezuela's Coffee Lands 1870-1930.

5030. Environmental Perception and Behavior Specialty Group: Geography of and for the Disabled. Norfolk.
Organizers: **Reginald G. Golledge**, University of California-Santa Barbara, **Douglas M. Amedeo**, University of Nebraska
Chair: **Reginald G. Golledge**, University of California-Santa Barbara
7:40 Douglas M. Amedeo, University of Nebraska, **Kate Speicher**, University of Nebraska, Essential Environmental and Spatial Concerns for the Visually Impaired;
7:55 Sona Karentz Andrews, University of Wisconsin-Milwaukee, Comprehension and Use of Mapped Information by Visually Impaired Children;
8:10 Don Parkes, University of Newcastle, NOMAD: Tactile-Audio Spatial Information Acquisition for the Visually Impaired;
8:25 Reginald G. Golledge, University of California-Santa Barbara, Andreas Flury, University of Zurich, Navigation Without Sight: Components of an Automated Pedestrian Guidance System;
8:40 Romedi Passini, University of Montreal, A Comparison of Wayfinding Abilities of Blind and Sighted Populations;
8:55 Joseph Wiedel, Univ of Maryland, Meeting the Map Needs of the Blind and Visually Impaired Visitor to Washington, DC.

5031. Climate Variability. Dufferin.
Chair: **Edward Aguado**, San Diego State University
7:40 Mary L.M. Marshall, The Ohio State University, Short Period North Atlantic Climate Fluctuations;
8:00 Cesar N. Caviedes, University of Florida, Increased Winter Storms in Chile and South Africa During ENSO Events;
8:20 David A. Robinson, Rutgers University, Snow Trends in the Central United States;
8:40 Elizabeth Law-Evans, Colorado State University, F.M. Smith, Colorado State University, **P.W. Mielke**, Colorado State University, Differentiating Changes in Climatic Variability in Southwestern Colorado;
9:00 Joel Michaelsen, University of California, Santa Barbara, **Laura Haston**, University of California, Santa Barbara, Large-Scale Precipitation Variability Over Western North America.

8:00 am to 9:20 am

5032. Transportation II. Windsor West.
Chair: **Frederick P. Stutz**, San Diego State University
8:00 Thomas J. Stevens, Federal Express Corp., One Stop Shopping is Now Available to the Global Express/Cargo Shipper;
8:20 Karen De Bres, Valparaiso University, Light at the End of the Tunnel? Eurotunnel and 1992;
8:40 Curtis W. Richards, University of Wisconsin-Parkside, Michael Thaller, Carroll College, The Rebirth of Short Line Railroads in the United States;
9:00 Dennis Dingemans, University of California, Davis, Freeway Planning and the Freeway Revolt in the San Francisco Bay Area.

5033. Political Geography: The Israeli-Palestinian Question. Dominion North.
Chair: **Walter G. Hardwick**, University of British Columbia
8:00 Tamar Mayer, Middlebury College, Nationalism and Work: The Case of Palestinian Laborers in Israel;
8:20 Ghazi Falah, Galilee Center for Social Research, The Geography of Intifadah and the Making of the New State of Palestine;
8:40 John G. Patterson, University of Wisconsin-Whitewater, The Palestinian Intifada: A Geographical Analysis;
9:00 Yossi Katz, Bar-Ilan University, The Political Status of Jerusalem in a Historical Context: Zionist Plans for the Partition of Jerusalem in the Years 1937-1938.

5034. Medical: AIDS. Conference G.
Chair: **Michael V. Hayes**, Simon Fraser University
8:00 William A. Bowen, California State University-Northridge, Mapping the AIDS Epidemic in California;
8:20 Joe Manzo, Concord College, An Exploratory Look at the Diffusion of AIDS in Tunisia;
8:40 John E. Coffman, University of Houston, The Spread of AIDS to Rural Texas: Changing Populations and Diffusion Scripts;
9:00 Nancy Davis Lewis, University of Hawaii, HIV Infection and Tourism: Implications for Pacific Island States.

8:00 am to 11:00 am

5035. Convention Placement Service. Promenade (Lower Concourse).

9:00 am to 12:00 noon

5036. Paper Sales. Sheraton Hall.

5037. Exhibits. Sheraton Hall.

9:35 am to 11:15 am

5038. Climate: Temperature, Evapotranspiration and Drought. Cinema I.
Chair: **Stewart J. Cohen**, Canadian Climate Centre
9:35 Eric S. Johnson, Illinois State University, Temperature Climatography of Central Illinois;
9:55 Matthew J. Stoll, Arizona State University, Analysis of Surface Temperature Variation Due to Land Use in Phoenix, Arizona;
10:15 Mark D. Schwartz, San Francisco State University, Detecting the Effect of "Green-up" on Surface Maximum Temperatures;
10:35 Rafique Ahmed, University of Wisconsin, La Crosse, The 1987-88 Drought in the Upper Midwest States: The Dimension of Precipitation Deficiency;

10:55 Marlyn L. Shelton, University of California, Davis, Evapotranspiration and Vegetation Change in California's Central Valley.

5039. Applied Geography Specialty Group: Citizen Participation in Applied Geography: Environmental Issues. Civic Ballroom.
Organizer: **Bill Leon**, University of Colorado at Colorado Springs
Chair: **Bill Leon**, University of Colorado at Colorado Springs
9:35 Mary M. Flad, Rudikoff & Rohde, Inc., **Harvey K. Flad**, Vassar College, Nimby and Beyond: Community Involvement in the Environmental Review Process for Proposed Social Facilities;
9:55 Richard A. Snyder, Roy F. Weston, Inc., Informing the Public: Low-level Radioactive Waste Disposal Site Selection in New York State;
10:15 James L. Sell, University of Arizona, Public Values and Park Planning;
10:35 David Morley, York University, Addressing Environmental Issues: The Activation of Multi-Interest Communities;
10:55 Roger L. Miller, University of Kentucky, The Socio-Political Expression of Ecological Crisis: A Typology of Eco-Activist Groups in Western Societies.

5040. Gender Issues. Dominion North.
Chair: **Rita M. Kozak**, University of Wisconsin-River Falls
9:35 Elisabeth J. Binder, University of Minnesota, The Nature of Geographia. Androcentrism in Geography;
9:55 Susan Wood, Indiana University of Pennsylvania, Gender Distinctions in Student Attitudes to Expected Urban Change;
10:15 Tara A. Kominiak, University of California-Los Angeles, Gender Differences in U.S. Mobility - 1975 to 1985;
10:35 Gisele Yasmeen, McGill Univ, Mutual Aid and Community Building: Montreal's Women's Housing Cooperatives.

5041. Hazards and Environmental Perception Specialty Groups: Sharing the Global Village: Natural Hazards and Environmental Perception Research in the 1990s. Wentworth.
Organizer: **Leaura M. Hennig**, University of Colorado
Chair: **Leaura M. Hennig**, University of Colorado
9:35 James K. Mitchell, Rutgers University, The International Decade for Natural Disaster Reduction: Evolution and Status;
9:55 James F. Palmer, State University of New York, Syracuse, **Jacques Gury**, Universite de Bretagne Occidentale, **Gilberto Oneto**, Architettua e Paesaggistica, **Ryuzo Ohno**, Kobe University, **Koh Dong-hee**, Cheju Junior College, **Yezmin Hernandez**, Universidad del Sagrado Corazon, **Santiago Alonso**, Ciudad Universitaria, **Richard C. Smardon**, State University of New York, Syracuse, **Andrej Pogacnik**, Univerza Edvarda Kardelja V Lubljana, Cross-cultural Assessment of Visual Impact Simulations;
10:15 Leaura M. Hennig, University of Colorado, The United States' Decade for Natural Disaster Reduction;
10:35 Risa Palm, University of Colorado, **Michael E. Hodgson**, University of Colorado, The Effects of a Mandated Insurance Offer on the Propensity to Purchase Earthquake Insurance.
Discussants: **William Riebsame**, University of Colorado, **Susan Cutter**, Rutgers University.

5042. Recreation, Tourism and Sport Specialty Group: The Resort Cycle in Theory and Practice. York.
Organizer: **Rudi Hartmann**, University of Colorado
Chair: **Rudi Hartmann**, University of Colorado
9:35 Richard W. Butler, University of Western Ontario, The Resort Cycle Revisited - A Decade of Discussion;
9:55 Klaus J. Meyer-Arendt, Mississippi State University, Environmental Aspects of Resort Evolution: Applicability of Resort Cycle Models;
10:15 Alison Gill, Simon Fraser University, Transition to a Four-Season Resort Destination: Issues and Problems in Whistler, British Columbia;
10:35 Keith Debbage, University of North Carolina-Greensboro, Oligopoly, The Profit Cycle, and Resort Development in the Bahamas.
Discussant: **Michael Haywood**, University of Guelph.

5043. Urban Geography, Regional Development and Planning and Applied Geography Specialty Groups: Cleveland's Civic Vision 2000 Plan: Planning for the Future. Grand Ballroom West, Section Y.
Organizer: **Harry L. Margulis**, Cleveland State University
Chair: **Harry L. Margulis**, Cleveland State University
9:35 Hunter Morrison, Cleveland City Planning Commission, Developing Cleveland's Waterfront;
9:55 Robert N. Brown, Cleveland City Planning Commission, Re-Configuring Cleveland's Industrial Development;
10:15 Linda Henrichsen, Cleveland City Planning Commission, Public Transit and Land Development in Cleveland's Dual Hub Corridor;
10:35 Frank Pietravola, Cleveland City Planning Commission, Consolidating Neighborhood Retailing;
10:55 Joseph D. Roman, Cleveland Tomorrow, Inc., The Private Sector's Role in Implementing Civic Vision 2000.

5044. Asian Geography Specialty Group (South Asia Division): South Asia: Bangladesh, Nepal, Pakistan. Grand Ballroom West, Section X.
Organizer: **Richard P. Palmieri**, Mary Washington College
Chair: **Richard P. Palmieri**, Mary Washington College
9:35 Anne Zonne Parker, University of Oregon, Ethnoagriculture in Eastern Nepal: Patterns and Processes;
9:55 Allen G. Noble, University of Akron, Descriptive Models of South Asian Cities;
10:15 Akhtar H. Siddiqi, Indiana State University, Fishing and Fisheries Along the Pakistan Coast;
10:35 John J. Metz, University of Wisconsin, Spatial Pattern of Environmental Use at Chimkhola, Nepal;
10:55 G. Venugopal, Ball State University, **Ashok K. Dutt**, University of Akron, Feasibility of Using NOAA AVHRR-NDVI Values for Delineation of Agroclimatic Regions of India.

5045. Political Geography Specialty Group: The Geography of Public Finance. VIP Room.
Organizer: **Gerald R. Webster**, University of Alabama
Chair: **Gerald R. Webster**, University of Alabama
9:35 J. Clark Archer, University of Nebraska-Lincoln, Time, Scale, and the Spatial Variability of Federal Outlays;
9:55 Chris Thompson, University of Wisconsin-Madison, The Geography of the "Entrepreneurial State": The Example of Public Venture Capital Programs in the USA;
10:15 Jeffrey R. Crump, San Diego State University, The Spatial Distribution of Department of Defense Procurement: A Disaggregated Perspective;
10:35 Gerald R. Webster, University of Alabama, The Changing Geography of Federal Grants to State and Local Governments, FY81-FY88.
Discussant: **Rex Honey**, University of Iowa.

5046. Cultural Ecology and Geomorphology Specialty Groups: Human Modifications of the Soil Environment II. Conference B.
Organizers: **Timothy P. Beach**, University of Wisconsin, Eau Claire, **Nicholas P. Dunning**, University of Cincinnati
Chair: **Nicholas P. Dunning**, University of Cincinnati
9:35 Gregory Knapp, University of Texas at Austin, Andean Anthrosols and Erosion: Modelling Outcomes of Intensification;
9:55 Timothy P. Beach, University of Wisconsin, Eau Claire, Comparisons of Fluvial Sediment Budgets;

10:15 Laurence A. Lewis, Clark University, Changes in the Erosional and Depositional System in Western Rwanda Resulting from the Expansion of Agriculture;
10:35 Steven J. Rainey, University of Texas at Austin, Soil Loss in Relation to Traditional Agricultural Practices in Mexico.

5047. Geographers at the International Agricultural Research Centers: Research Results and Interdisciplinary Experiences II. Peel.
Organizer: **Abe Goldman**, University of Florida
Chair: **David J. Campbell**, Michigan State University
9:35 Anthony Bebbington, Cambridge University, Peasants, Institutions and Technological Change: Geographic Theory and Social Practice.
Simon E. Carter, Centro Internacional de Agricultura Tropical;
Judith Carney, University of California, Los Angeles;
Dianne Rocheleau, Clark University;
Abe Goldman, University of Florida;
James Delehanty, University of Wisconsin-Madison;
Discussant: **Nigel J.H. Smith**, University of Florida.

5048. Socialist Geography Specialty Group & Antipode: Marxism, Post-Marxism and Human Geography II: Economic. Dominion South.
Organizers: **Eric Sheppard**, University of Minnesota, **Derek Gregory**, University of British Columbia
Chair: **Derek Gregory**, University of British Columbia
9:35 Michael Webber, University of Melbourne, The Challenge of the "Posts";
9:55 Julie Graham, University of Massachusetts, Industrial Geography and Marxism: Toward an Alternative Integration.
Discussant: **Eric Sheppard**, University of Minnesota.

5049. Latin America Specialty Group: Future Directions in Latin American Geographical Research II. Elgin.
Organizer: **Gary S. Elbow**, Texas Tech University
Chair: **Oscar H. Horst**, Western Michigan University
Cesar N. Caviedes, University of Florida;
David R. Clawson, University of New Orleans;
Kent Mathewson, Louisiana State University;
Susan E. Place, California State University, Chico.

5050. Solid Waste Management Issues in Urban and Rural Contexts. Kenora.
Organizer: **John W. Frazier**, State University of New York at Binghamton
Chair: **John W. Frazier**, State University of New York at Binghamton
9:35 Philip D. Koos Jr., Northern Tier Regional Planning & Development Comm, Solid Waste Management in a Rural Development Region of Pennsylvania;
9:55 Claudia E. Stallman, Cornell Cooperative Extension, Resource Recovery, Solid Waste Management and Recycling in Broome County, New York;
10:15 John W. Frazier, State University of New York at Binghamton, The Placeness of Household Recycling in Three Broome County Communities;
10:35 Florence Lansana, Kent State University, Household Recycling: A Causal Analysis of Behavior, Communication Channels, Attitudes and Demographic Attributes.

5051. Microcomputers Specialty Group: Publishing Software: From How to Write it to Where to Publish. Kent.
Organizer: **Robert Sechrist**, Indiana University of PA
Chair: **Robert Sechrist**, Indiana University of PA
Frank Gossette, California State University, Long Beach;
Peter F. Fisher, Kent State University;
Andrew J. Krmenec, Northern Illinois University;
Lucinda Gatch, West Publishing Co.;
Discussant: **Robert Sechrist**, Indiana University of PA.

5052. Political Geography Specialty Group: Territory and Power II. Simcoe.
Organizers: **Barney Warf**, Kent State University, **Lynn A. Staehell**, University of Colorado at Boulder
Chair: **Lynn A. Staehell**, University of Colorado at Boulder
9:35 Michael Heiman, Dickinson College, The Local Defense of Residential Space:A Challenge to the National Environmental Agenda;
9:55 Fred Shelley, University of Southern California, **Dave R. Reynolds**, University of Iowa, Local Control and the Territorial Organization of American Public Education;
10:15 David Wilson, Indiana University, Contingent Slum Persistence: An Application of the Political Economy of Place Thesis;
10:35 Barney Warf, Kent State University, Consciousness, Spatial Scale, and the Locality Debate.
Discussant: **Sallie A. Marston**, University of Arizona.

5053. AAG Archives and Association History Committee and Cultural Geography Specialty Group: Geography and the History of Science II. City Hall.
Organizers: **Mona Domosh**, San Diego State University, **Martin S. Kenzer**, University of Southern California
Chair: **Mona Domosh**, San Diego State University
9:35 David N. Livingstone, The Queen's University of Belfast, Geography and Modernity: Past and Present;
9:55 Michael Curry, University of California at Los Angeles, Postmodernism and the Search for Geographies Beyond Time;
10:15 Melinda Laituri, University of Arizona, The Production of Knowledge.
Discussant: **Michael Dear**, University of Southern California.

5054. Climate Specialty Group: Urban Climatology II. Conference D.
Organizer: **A. John Arnfield**, The Ohio State University
Chair: **A. John Arnfield**, The Ohio State University
9:35 Gerald Mills, Bowling Green State University, The Role of Buoyancy in the Energy Budgets of Urban Canyons;
10:05 A. John Arnfield, The Ohio State University, An Analysis of the Energy Budget for an Urban Canyon;
10:35 James A. Voogt, University of British Columbia, **T.R. Oke**, University of British Columbia, Validation of an Urban Canyon Radiation Model for Nocturnal Long-Wave Radiative Fluxes.

5055. Spatial Problems, Regional Development and the Expansion Method II. Conference E.
Organizer: **C. Cindy Fan**, UCLA
Chair: **John Paul Jones III**, University of Kentucky
9:35 Kavita Pandit, University of Georgia, **Steven R. Holloway**, University of Wisconsin, The Disparity Between GNP per capita and the Quality of Life: A Spatial Analysis Using the Expansion Method;
9:55 Clayton Kie, The Ohio State University, Contrasts in Regional Industrial Productivity Change;
10:15 Stuart A. Foster, Western Kentucky University, An Analysis of the Locational Dynamics of Physician Supply;
10:35 Sotiria Koloutsou-Vakakis, University of California, Los Angeles, Interregional Migration and Spatial Interaction Models.

5056. China Specialty Group: China Fieldwork After Tianamen?. Conference F.
Organizer: **Kok Chiang Tan**, University of Guelph
Chair: **Kok Chiang Tan**, University of Guelph
Gregory Veeck, Louisiana State University;

C.P. Lo, University of Georgia;
Clifton W. Pannell, University of Georgia;
Shiu-hung Luk, University of Toronto;
Joseph B. Whitney, University of Toronto;
Kok Chiang Tan, University of Guelph;

5057. Mathematical Models & Quantitative Methods Specialty Group: Applications of Longitudinal Analysis. Grand Ballroom West, Section Z.
Organizer: **John Odland**, Indiana University
Chair: **Steven Reader**, McMaster University
9:35 Stephen A. Matthews, University of California, Los Angeles, Survival Analysis for Youth Labor Market Data;
9:55 Adrian J. Bailey, Dartmouth College, Unemployment Experience and the Duration of Residential Sojourns;
10:15 Mark Ellis, Florida State University, Modeling AIDS Morbidity and Mortality in Florida;
10:35 John Odland, Indiana University, Longitudinal Methods in the Analysis of Spatial Patterns.

5058. Water Resources: Planning. Dufferin.
Chair: **Steven I. Gordon**, Ohio State University
9:35 Stephen E. White, Kansas State University, **David E. Kromm**, Kansas State University, The Adoption of Water-Saving Practices Among High Plains Irrigators;
9:55 F. Andrew Schoolmaster, University of North Texas, A Geographical Examination of Water Marketing in the Western United States;
10:15 Thomas A. Wikle, Oklahoma State Univ, Discrepancies in the Acceptability of Alternative River Rationing Policies;
10:35 Daniel G. Conaty, San Diego State University, Regional Variation in the Application of Clean Water Act Standards;
10:55 N. C. Heywood, University of Wisconsin-Stevens Point, **Scott M. Johnson**, Leesburg, Virginia Planning Department, Planning for Disease Emergencies in Public Water Supplies.

5059. Agriculture: Improvements, Hazards and Evaluation. Carlton.
Chair: **Robert Phillips**, CSU-Sacramento
9:35 Jim Hiley, Agriculture Canada, Assessing Agricultural Production in Alberta with an Integrated, Biophysical Landscape Approach;
9:55 Juana L.C. Ibanez, University of Texas at Austin, Land Reclamation and the Past in Southern Italy;
10:15 John A. Cross, University of Wisconsin-Oshkosh, 1988 Drought Impacts Among Wisconsin Dairy Farmers;
10:35 Derrick J. Thom, Utah State University, African Irrigation Development: Inventory and Prospects;
10:55 Johnathan Bascom, East Carolina University, The Demise of Pastoralism Among Eritrean Refugees in the Sudan.

5060. Urban Social Problems II. Windsor East.
Chair: **Roman Cybriwsky**, Temple University Japan
9:35 Vincent H. Malmstrom, Dartmouth College, Inequality in Sweden: Has the Spatial Dimension Been Annihilated?;
9:55 Claude F. Marchand, ICURR, Luce Proulx, Universite de Montreal, The Distribution of Drug Addiction in Greater Montreal, 1986;
10:15 John P. Radford, York University, **Glenda Laws**, Pennsylvania State University, Lost in Space? The Use of Urban Space by Individuals Labelled as Developmentally Handicapped;
10:35 DeWitt Davis Jr., University of the District of Columbia, Homicides in the Capital City: A Case Study of Washington DC;
10:55 Keith D. Bolling, Syracuse University, The Study of Race and Racism in British Geography: A New Geography of Racism?.

5061. Industrial Restructuring II. Huron.
Chair: **Rod B. McNaughton**, The University of Lethbridge
9:35 James A. Davis, Arizona State University, Spatial Issues in the Competition for Economic Development in Metropolitan Areas;
9:55 Ian MacLachlan, University of Lethbridge, Plant Closings and Acquisition;
10:15 Harry Zondag, University of Utrecht, Business Economic Indicators for Evaluating the Regional Structure of Production;
10:35 A. M. Rekers, University of Utrecht, The Influence of Urban Contexts on Ethnic Enterprises in the Netherlands.

5062. Native American Policy Issues. Oxford.
Chair: **Frank Duerden**, Ryerson Polytechnical Institute
9:35 Anne Meaney-Leckie, State University of New York-Geneseo, The Yukon Land Claims Agreement: Negotiating a Final Settlement;
9:55 Anita Joan Wepfer, West Georgia College, The Recent Exercise of Resource Rights by the Wisconsin Ojibwe;
10:15 David Wishart, University of Nebraska, Payments for Original Indian Territories: A Geographical Interpretation of Indian Dispossession;
10:35 Daniel G. Cole, Smithsonian Institution, A Cartographic Analysis of Contemporary Environmental Issues on Indian Lands;
10:55 Janet Gritzner, South Dakota State University, The GIS as a Data Integrator in Cultural/Historical Geography.

5063. GIS/Planning. Conference C.
Chair: **Nancy J. Obermeyer**, Natl Ctr for Geographic Information and Analysis
9:35 Graham Dudley, University of Waterloo, A Knowledge-Based Spatial Decision Support System for Use in the Consent Review Process;
9:55 Jack Ford, Shippensburg University, Municipal Level Comprehensive Planning Utilizing a Land Information System;
10:15 Denis E. Mudderman, Indiana State University, Indiana's Global Design Model for State GIS;
10:35 Dan Holmes, University of California-Berkeley, Access to Geographic Information.

5064. Population: Methodological Issues. Conference G.
Chair: **Robert Nunley**, University of Kansas
9:35 Mark P. Kumler, University of California-Santa Barbara, The Elusive Population Centroid of Canada;
9:55 Catherine E. Dixon, University of South Florida, Undocumented Cities: Accounting for the Homeless in the 1990 Census;
10:15 Richard Lycan, Portland State University, School Demography and the GIS;
10:35 Donald C. Dahmann, US Bureau of the Census, County-Based Approaches to Categorizing Settlements and Their Application to U.S. Population Research;
10:55 Helga Upmeier, University of Kansas, Developing Population Projections.

5065. Cartography Specialty Group: Business Meeting. Cinema II.
Chair: **Laurence W. Carstensen**, Virginia Polytechnic Institute & State University

5066. Cultural Specialty Group: Business Meeting. Grand Ballroom Centre.
Chair: **Lester B. Rowntree**, San Jose State University

5067. Urban Geography and Socialist Geography Specialty Groups: Restructuring the City. Essex.
Organizer: **Scott Salmon**, Syracuse University
Chair: **Helga Leitner**, University of Minnesota
9:35 Scott Salmon, Syracuse University, Space, Place, and Urban Political Economy;

9:55 William Mallett, Cornell University, Recent Employment Trends in Specialized Service Cities of the US: Some Implications for Urban Politics;
10:15 Andrew Herod, Rutgers University, From Rag Trade to Real Estate: Land Use Conflicts in New York's Garment Center;
10:35 A.G. Phipps, University of Windsor, Public School Closures in Saskatoon and Windsor, 1978-88.
Discussants: **Andrew Kirby**, University of Arizona, Helga Leitner, University of Minnesota.

5068. Environmental Perception and Behavioral Geography and Urban Geography Specialty Group: Contemporary Issues in Time Geography. Norfolk.
Organizer: **Stuart C. Aitken**, San Diego State University
Chair: **Stuart C. Aitken**, San Diego State University
9:35 Donald G. Janelle, University of Western Ontario, **Michael F. Goodchild**, University of California-SB, Space-Time Diaries and Temporal Patterns of Urban Ecological Structure;
9:55 William Michelson, University of Toronto, Time-Geography at the Micro Scale of Housing;
10:15 George Rengert, Temple University, Time for Crime: The Impact of Work on the Time Use of Residential Burglars.
Discussant: **Timothy J. Fik**, University of Florida.

5069. Transportation and Marketing. Windsor West.
Chair: **William R. Black**, Indiana University
9:35 Bruno P. Parolin, University of New South Wales, A Review of Methods for Measuring Public Transportation Needs;
9:55 Howard E. Olson, Self-employed transportation geographer (retired), Potential Impact of Global Warming on Transportation of United States and Canadian Grain and Coal Exports;
10:15 Gordon L. Levine, University of Minnesota, Duluth, The Operational Pattern of Vessels Plying Lake Superior;
10:35 Harold M. Mayer, University of Wisconsin-Milwaukee, Great Lakes and St. Lawrence Seaway Shipping and Ports: US and Canadian Policy Differences;
10:55 Russell B. Capelle Jr., Regular Common Carrier Conference, Spatial Impacts of US-Canadian Transborder Trucking.

9:35 am to 1:10 pm

5070. Senior Visiting Geographers from Eastern Europe: Panel Discussion. Grand Ballroom East.
Organizer: **George W. Hoffman**, Professor Emeritus, University of Texas at Austin
Chairs: **George W. Hoffman**, Professor Emeritus, University of Texas at Austin, **George J. Demko**, Dartmouth College
Jan Drdos, Inst of Geography, Slovak Academy of Sciences;
J. Heinzmann, Inst for Geography/Geookologie, Academy of Science;
Piotr Korcelli, Inst of Geography, Polish Academy of Sciences;
Vaclav Kral, Inst of Cartography, Karlovy University Prague;
Jozsef Toth, Ctr for Reg Studies, Hungarian Academy of Sciences.

11:30 am to 1:10 pm

5071. Projet Louisiane: Ten Years After. Grand Ballroom West, Section Z.
Organizers: **Dean Louder**, Universite Laval, **Gerald Gold**, York University, **Cecyle Trepanier**, Universite Laval
Chair: **Dean Louder**, Universite Laval
Gerald Gold, York University;
Cecyle Trepanier, Universite Laval;
Robert E. Maguire, Inter-American Foundation.

5072. Circulation Patterns in the Urban Field. Windsor East.
Chair: **James O. Wheeler**, University of Georgia
11:30 Gerald Walker, York University, Developing the Concept of Locale: Exurban Locality in Toronto's Urban Shadow;
11:50 John E. Harmon, Central Connecticut State University, The Spatial Structure of Newspaper Circulation Fields;
12:10 Mark Monmonier, Syracuse University, Newspaper Home-Delivery Areas in Central New York: Extending the Umbrella Hypothesis from One to Two Dimensions;
12:30 Sara McLafferty, Hunter College, **Valerie Preston**, York University, Wage Rates and Commuting Times for Service Workers;
12:50 Charles Hurst, State of Indiana, Commuting Patterns of Rural and Urban-Fringe Communities in Indiana: 1984-87.

5073. Applied Geography Specialty Group: Citizen Participation in Applied Geography: Economic Development Issues. Civic Ballroom.
Organizer: **Bill Leon**, University of Colorado
Chair: **Bill Leon**, University of Colorado at Colorado Springs
11:30 Howard Schretter, University of Georgia, State Growth Planning: The Georgia Initiative;
11:50 Kim D. Barnes, Northern Tier Regional Planning & Development Comm, **Philip D. Koos Jr.**, Northern Tier Regional Planning & Development Comm, **John W. Frazier**, State University of New York at Binghamton, Community Development Block Grant Programs: Planning in a Rural Context;
12:10 Doug Konrad, University of British Columbia, **Kris Olds**, Centre for Human Settlements, UBC, The Role of a Neighbourhood Organization in the Transformation of an Inner City Skid Road Neighbourhood;
12:30 Christopher R. Bryant, University of Waterloo, Public Participation in Community Economic Development: Paths to Sustainable Development.

5074. Political Geography: Elections and Voting. Grand Ballroom West, Section Y.
Chair: **Robert E. Norris**, Oklahoma State University
11:30 Robert Earickson, University of Maryland-Baltimore Co, Areal Associations of Voters on a Handgun Law Referendum in Maryland;
11:50 Jonathan Leib, Syracuse University, Congressional Partisan Gerrymandering in the 1980s: The Case of Indiana;
12:10 Kenneth C. Martis, West Virginia University, A Geographical Analysis of Congressional Roll Call Voting Behavior;
12:30 Mark Flaherty, University of Victoria, **William Crumplin**, Queen's University, Compactness and Electoral Boundary Adjustment in British Columbia, Canada;
12:50 J. Paul Herr, Indiana University at South Bend, Territoriality, Incumbency, and Ideology in National Elections.

5075. Ethnicity. Spin Drift (4th floor)
Chair: **Paul W. Blank**, Middlebury College
11:30 Thomas M. Whitmore, Clark University, Dynamic Systems Modeling in Cultural Ecology;
11:50 Paul W. Blank, Middlebury College, Landscapes of Inequality: Environment and Location in Economic Development;
12:10 Jan Penrose, University College London, Ethnicity: Theoretical Conceptions and Empirical Perceptions;
12:30 Kimberly Reiter, Univ of Arizona, Geographic Constraints Upon the Romanization Process in the French Pyrenees;
12:50 James E. Vance Jr., University of California, Berkeley, The Geometry of Frontiers: Canadian-American Contrasts.

5076. Political Geography, Contemporary Agriculture and Rural Land Use Specialty Groups: Agricultural Development, Agrarian Politics and the State I. Windsor West.

Organizer: **Frances M. Ufkes**, University of Iowa
Chair: **Nancy Ettlinger**, Ohio State University
11:30 R. J. Johnston, University of Sheffield, **C. J. Pattie**, University of Nottingham, The Green Party as a New Electoral Force in Great Britain?
11:50 Frances M. Ufkes, University of Iowa, Transformation of Production and Marketing Relations in Western Illinois Agriculture, 1950-1989;
12:10 Dave R. Reynolds, University of Iowa, The Restructuring of Social Relations in the Countryside: The School Consolidation Movement in Iowa, 1895-1925;
12:30 E. A. Schwartz, University of Missouri-Columbia, Illusions for Realities: The Failure of Allotment of Indian Lands.
Discussant: **Richard A. Walker**, UC- Berkeley.

5077. Agricultural Responses to Climatic Hazards. Carlton.
Chair: **Cesar N. Caviedes**, University of Florida
11:30 John Corbett, University of Minnesota, Small-Holder Agriculture in Semiarid Kenya;
11:50 Charles David Frederick, University of Texas at Austin, **Tom Hickson**, University of Texas, **Jim Kimmel**, University of Texas, Post-Colonial Landscape Modification in the Northern Bajio (Guanajuato), Mexico;
12:10 Stewart K. McCroskey, University of Tennessee, Human Response to Drought: Domestic Water Management on Antigua;
12:30 Clifton Dixon, Memphis State University, Yucatan After the Wind: Human and Environmental Situations A Year After Hurricane Gilbert;
12:50 James Delehanty, University of Wisconsin-Madison, The Meaning of Sahelian Weather: Drought and Hausa Metaphysics.

5078. North America Under Free Trade/Europe 1992, Comparisons and Contrasts: A Research Agenda for the 1990s. Grand Ballroom West, Section X.
Organizer: **Janos Wimpffen**, KJS Associates, Inc.
Chair: **Janos Wimpffen**, KJS Associates, Inc.
Janos Wimpffen, KJS Associates, Inc.;
James E. Randall, University of Saskatchewan;
Barney Warf, Kent State University;
Ann M. Oberhauser, University of Toledo;
Russell B. Capelle Jr., Regular Common Carrier Conference.

5079. Asian Geography Specialty Group (South Asia Division): South Asia: India. VIP Room.
Organizer: **Richard P. Palmieri**, Mary Washington College
Chair: **Richard P. Palmieri**, Mary Washington College
11:30 R.C. Tiwari, University of Manitoba, Some Observations on Family Planning in India;
11:50 William A. Noble, University of Missouri, Toda Huts and Houses (The Nilgiris, Southern India);
12:10 Anindita Sen, University of Akron, Muslims in India: Rural-Urban and Male-Female Ratio Variation;
12:30 Anupa Mukhopadhyay, University of Akron, The Spatial Relationship of a Calcutta Slum;
12:50 Suprabha Tripathi, University of Akron, The Anatomy of a Delhi Slum.

5080. Recreation, Tourism and Sport Specialty Group: Recreation and Leisure I. York.
Organizer: **Paul F. Wilkinson**, York University
Chair: **Paul F. Wilkinson**, York University
11:30 William H. Cheek, Southwest Missouri State University, **Steve Illum**, Southwest Missouri State University, An Assessment of Pre-Employment Expectations and Employment Experiences of Travel Professionals;
11:50 Reiner Jaakson, University of Toronto, **Tiia Karing**, Estonian Tourism Bureau, Tourism and Glasnost, Perestroyka, and Ethnic Assertion in Estonia;
12:10 Lisle S. Mitchell, University of South Carolina, Leisure Time and Space Use: Female-Male Differences;
12:30 Robert L. Janiskee, University of South Carolina, The Golf Industry of the South Carolina Grand Strand.

5081. The Social Geography of the North American City, 1900-1940: I. Norfolk.
Organizer: **Richard Harris**, McMaster University
Chair: **Sallie A. Marston**, University of Arizona
11:30 Richard Harris, McMaster University, The Social Geography of the North American City, 1900-1940: An Overview and Reinterpretation;
11:50 Robert Lewis, McGill University, Industrial and Working-Class Suburbanization in Montreal, 1890-1929;
12:10 Richard Dennis, University College London, Private Investment in Inner-City Housing: Toronto 1880-1920.
Discussant: **David Ward**, University of Wisconsin, Madison.

5082. Hazards Specialty Group: New Directions in Hazards Theory. Wentworth.
Organizer: **Susan Cutter**, Rutgers University
Chair: **Susan Cutter**, Rutgers University
Ben Wisner, Hampshire College;
Diana M. Liverman, Pennsylvania State University;
John Sorenson, Oak Ridge National Lab;
Susan Cutter, Rutgers University;
Peter Timmerman, University of Toronto;
Sherry D. Oaks, University of Colorado/U.S. Geological Survey.

5083. Water Resources and Political Geography Specialty Groups: Alternative Environmental Futures: Beyond Critique. Dufferin.
Organizer: **Jacque Emel**, Clark University
Chair: **Jacque Emel**, Clark University
Sue Golding, University of Toronto;
Michael Heiman, Dickinson College;
Edward Relph, University of Toronto;
James L. Wescoat, Jr., University of Colorado.

5084. AAG Archives and Association History Committee and the Geomorphology and Coastal and Marine Specialty Groups: Panel Session on Historic Developments in Geomorphology. City Hall.
Organizers: **Douglas J. Sherman**, University of Southern California, **Martin S. Kenzer**, University of Southern California
Chair: **Douglas J. Sherman**, University of Southern California
Bernard O. Bauer, University of Southern California;
Stanley W. Trimble, University of Chicago;
Robin Davidson-Arnott, University of Guelph;
Rorke B. Bryan, University of Toronto;
Norbert P. Psuty, Rutgers University;
Donald L. Johnson, University of Illinois-Urbana/Champaign;
David R. Butler, University of Georgia.

5085. Spatial Problems, Regional Development and the Expansion Method III. Conference E.
Organizer: **C. Cindy Fan**, UCLA
Chair: **Stuart A. Foster**, Western Kentucky University
11:30 Mike Hannan, Edinboro University, **Robert Walker**, Florida State University, The Dynamics of Immigration Settlement Processes and Possible Impacts on Internal Migration Systems;
11:50 Kyoko Tanaka, Ohio State University, **W. Randy Smith**, Ohio State University, **Emilio Casetti**, Ohio State Univ, Dynamics of Influence of Income on Interregional Migration in the U.S.;
12:10 Mary B. Kimsey, University of Georgia, Deforestation in Tropical Regions: A Study of Regional Variation;
12:30 James Lewandowski, Ohio State University, Analyzing

Trade Policies for Developing Nations Using the Expansion Method.

5086. Cartography: Cognitive/Behavioural. Peel.
Chair: **Matthew McGranaghan**, University of Hawaii
11:30 **Richard E. Lindenberg**, Kent State University, **Audrey E. Clarke**, Kent State University, The Importance of the Figure-Ground Relationship in Hue Selection for Bipolar Choropleth Maps;
11:50 **Daniel E. Frye**, University of Wisconsin, Stevens Point, Isarithmic and Transect Map Point Value Estimation;
12:10 **Robert Lloyd**, University of South Carolina, **Larry Skipper**, University of South Carolina, Patterns on Cognitive Maps: Encoding and Decoding Processes;
12:30 **Theodore R. Steinke**, University of South Carolina, Cognitive Processing of Graphic and Verbal Information on Maps;
12:50 **Jeremy Crampton**, Pennsylvania State University, The Acquisition of Expertise in a Display-Based Context: The Role of Cartographic Skills.

5087. Topics in China Geography. Conference F.
Chair: **Joseph B. Whitney**, University of Toronto
11:30 **Carolyn L. Cartier**, University of California-Berkeley, Port Cities of Southeastern China: Historical Urban Development in Xiamen, Fuzhou, and Ningbo;
11:50 **Michael Kuby**, Arizona State University, China's Coal Transport Bottleneck: Problems and Solutions;
12:10 **Bin Li**, Syracuse University, From Direct to Indirect Monetary Control: Necessities and Conditions in China;
12:30 **Jidong Zhang**, University of Saskatchewan, China's Urban Housing: A Structuration Perspective;
12:50 **Tsering Tsomo**, University of Kentucky, Geography of a Socialist City - Lhasa, Tibet.

5088. Urban Revitalization. Essex.
Chair: **William J. Lloyd**, CSU-Fullerton
11:30 **H. Briavel Holcomb**, Rutgers University, **Peter Parisi**, The Pennsylvania State University, Media and the Redeveloping City: Equivocal Relations;
11:50 **Gary L. Galle**, University of Colorado, **Susan E. Clarke**, University of Colorado, Cities That Hustle: Entrepreneurship in US Local Government;
12:10 **David B. Cole**, University of Northern Colorado, Reinvestment and Redevelopment: Artists' Neighborhoods in Chicago;
12:30 **Daniel J. Hammel**, University of Minnesota, Classifying Gentrified Neighborhoods;
12:50 **Clare Mitchell**, University of Waterloo, **Robert Nolan**, University of Waterloo, **Fran Hohol**, University of Waterloo, Downtown Revitalization: The Case of St. Jacobs, Ontario.

5089. Gender Issues: Third World Case Studies. Executive Suite (4th floor)
Chair: **Bimal Kanti Paul**, Old Dominion University
11:30 **Bimal Kanti Paul**, Old Dominion University, "Women in Development": A Taxonomic Analysis;
11:50 **Cherub Antwi-Nsiah**, University of Illinois, Urbana, Problems of Gender, Class, and Regional Inequalities in Ghana: A Research Methodology;
12:10 **Elaine Bliss**, University of Wisconsin-Milwaukee, Women and Agricultural Dependency: The Garifuna in Hopkins, Belize;
12:30 **Helen Ruth Aspaas**, University of Colorado, Women's Small-Scale Enterprises in Rural Kenya: Coping with Isolation.

5090. Energy Issues and the Environment. Kenora.
Chair: **Barry D. Solomon**, US EPA
11:30 **Catherine H. Helgeland**, University of Wisconsin-Manitowoc Co., Demographic Characteristics of Evacuees vs. Non-Evacuees in a Post-Chernobyl Nuclear Power Plant Accident Scenario;
11:50 **Donald J. Zeigler**, Old Dominion University, The Maine Yankee Referenda: A Distance-Decay Analysis of Opposition to Nuclear Power;
12:10 **Richard G. Kuhn**, University of Guelph, Energy Forecasting and the Environment;
12:30 **Susan Macey**, Southwest Texas State University, **Marilyn Brown**, Oak Ridge National Laboratory, Demonstrations as a Policy Instrument with Energy Technology Examples.

5091. Economic Restructuring. Huron.
Chair: **Ian MacLachlan**, University of Lethbridge
11:30 **C. Murray Austin**, University of Northern Iowa, Some Geographic Implications of the Emerging Global Economy;
11:50 **David Clark**, Coventry Polytechnic, Urban Decline and Planning Policies in Britain;
12:10 **Nicholas Phelps**, Newcastle University, Corporate Restructuring and Regional Development: The Case of the Northern Region of England;
12:30 **Philip Shapira**, Regional Research Institute, Steeltown to Spaceworld? Japan's Heavy Industry Restructuring and Regional Development;
12:50 **David Faust**, University of Minnesota-Twin Cities, The Integrated Rural Development Program in India.

5092. Quantitative Methods and Transportation. Kent.
Chair: **Grant Ian Thrall**, University of Florida-Gainesville
11:30 **Valerian T. Noronha**, University of Alberta, Strategic Locations for Vehicle Inspection Stations on Highway Networks;
11:50 **Morton O'Kelly**, Ohio State University, Routing Problems in Hub Networks;
12:10 **Glen Harrison**, Oak Ridge National Laboratory, **Cheng Liu**, University of Tennessee, **Becky Guinn**, SAIC Corporation, An Allocation Model for Channels Delivery of Cargo and Passengers;
12:30 **O. Benjamin Schoepfle**, Boston University, **Richard L. Church**, University of California, Santa Barbara, An Exact Network Representation of a "Classic" School Districting Problem;
12:50 **Russell Lee**, Oak Ridge National Laboratory, Uranium Market Model.

5093. Soil Erosion and Hillslope Processes. Conference B.
Chair: **Laurence A. Lewis**, Clark University
11:30 **Wolfgang Merz**, University of Toronto, **Rorke B. Bryan**, University of Toronto, Threshold Conditions for Rill Erosion on Agricultural Soils;
11:50 **Trevor M. Harris**, West Virginia University, **John Boardman**, Brighton Polytechnic, Soil Erosion Prediction and Conservation Targetting Using Expert Systems;
12:10 **Ross A. Sutherland**, University of Saskatchewan, **E. De Jong**, University of Saskatchewan, Caesium-137 Estimates of Accelerated Erosion in Agricultural Areas of Saskatchewan;
12:30 **Thomas W. Small**, Frostburg State University, The Treethrow Rootplate Disintegration/Mound Erosion Model;
12:50 **Joseph P. Seney**, Montana State University, **John P. Wilson**, Montana State Univ, Erosional Impact of Hikers, Horses, Off-Road Bicyclists, and Motorcycles on Mountain Trails.

5094. The Regionalization of Services. Conference C.
Chair: **Gerald H. Krausse**, University of Rhode Island
11:30 **John Allen**, The Open University, The Regionalization of Services: Growth and Polarization in the South East of England;
11:50 **Nancy R. Bain**, Ohio University, Banking Regulations and Persistence, Deregulation and Change: A Case Study of

Banking in Rural Ohio;
12:10 Thomas S. Fedor, Indiana University, Indianapolis, Changes in the Banking Industry and the Rise of the Superregional Banks;
12:30 Siyoung Park, Western Illinois University, Retail Trends in Illinois Counties 1935-1985.

5095. Climate: Radiation and Remote Sensing. Conference D.
Chair: **John A. Harrington Jr.**, Indiana State University
11:30 Stephen J. Stadler, Oklahoma State University, **Edwin Kessler**, Oklahoma University, The Annual Precipitation "Drop-Off" in Central Oklahoma;
11:50 Keith R. Mountain, Portland State University, The Role of Terrain Longwave Enhancement in the Net Radiative Balance of an Alpine Glacier;
12:10 Claude Duguay, University of Ottawa, Radiation Modelling Over Rugged Terrain Using Remotely Sensed Imagery;
12:30 Howard W. Barker, McMaster University, **John A. Davies**, McMaster University, Multifractal Representation of Cloud-Radiation Interactions in Climate Models;
12:50 Ted J. Alsop, Utah State University, Using Satellite Data to Estimate Solar Irradiance.

5096. Toponymy. Oxford.
Chair: **Daniel G. Cole**, Smithsonian Institution
11:30 Charles J. Farmer, Frostburg State University, Joseph Martin's Gazetteer;
11:50 Jon Campbell, US Geological Survey, Stream Generic Terms as Indicators of Historical Settlement Patterns;
12:10 Robert E. Ford, Brigham Young University, Toponymic Generic Place Names in Pre-Independence Belize and Culture History;
12:30 Harold E. Gulley, University of Wisconsin-Oshkosh, Southern Nationalism on the Landscape: County Names in Ex-Confederate States;
12:50 James E. Lightfoot, University of Central Arkansas, Dual Toponyms of Hamlets in Central Arkansas.

5097. Migration: General Session. Conference G.
Chair: **David A. Plane**, University of Arizona
11:30 Gundars Rudzitis, University of Idaho, A Sense of Place Model of Mobility;
11:50 Raymond Keith Oldakowski, University of Illinois, Migration Expectations and Actual Behavior;
12:10 James F. Fryman, University of Northern Iowa, Geographic Analysis of Interstate College Student Migration to Public Four Year Institutions of Higher Education;
12:30 Jean M. Eichhorst, University of North Dakota, **Mohammad Hemmasi**, University of North Dakota, Employment Location Perception and Preference of University Students;
12:50 C. Taylor Barnes, US Air Force Academy, Military Retirement Migration: Patterns and Implications.

5098. Historical Specialty Group: Business Meeting. Grand Ballroom Centre.
Chair: **Carville Earle**, Louisiana State University

5099. New Models in Geography III. Dominion North.
Organizers: **Richard Peet**, Clark University, **Nigel Thrift**, University of Bristol
Chair: **Richard Peet**, Clark University
11:30 Eric Sheppard, University of Minnesota, **Helga Leitner**, University of Minnesota, The City as Locus of Production;
11:50 Geraldine Pratt, University of British Columbia, On the Reproduction of Academic Discourse: Class and the Spatial Structure of the City;
12:10 Suzanne Mackenzie, Carleton University, Gender and Economy: The Politics of Urban Change;
12:30 Linda McDowell, The Open University, Diversity and the Contradictions of Oppression: New Approaches in Feminist Geography.
Discussant: **Neil Smith**, Rutgers University.

5100. Geographic Thought I. Dominion South.
Chair: **Gordon R. Lewthwaite**, California State University, Northridge
11:30 Walter G. Hardwick, University of British Columbia, Complexity, Living Systems, and Human Geography;
11:50 Russell L. Stubbles, South Dakota State University, The Use of the Delphi Technique in Geography;
12:10 Chand Wije, Kent State University, Law (and Public Policy?) and the Departments of Geography;
12:30 James W. Fonseca, George Mason University, Teaching the Concept of Region;
12:50 Alvin W. Urquhart, University of Oregon, Environment: Events, Not an Object.

5101. Latin American Specialty Group: Toward a Geography of Human Rights: Case Studies. Elgin.
Organizer: **Mark M. Miller**, Univ of Southern Mississippi
Chair: **Mark M. Miller**, University of Southern Mississippi
11:30 Mark M. Miller, University of Southern Mississippi, **Barbara Keller Miller**, Mexico: Toward a Geography of Human Rights;
11:50 Gary S. Elbow, Texas Tech University, The Overground Railroad: Grass Roots Response to the Human Rights Situation in Central America;
12:10 Joseph L. Scarpaci, Virginia Polytechnic Institute & State University, State Terror: Social Justice and the Use of Public and Private Spaces;
12:30 Bernard Nietschmann, University of California-Berkeley, Global Patterns of Human Rights Violations.
Discussant: **Martin S. Kenzer**, University of Southern California.

5102. Traditional Resource Management in Riverine Amazonia. Simcoe.
Organizer: **Mario Hiraoka**, Millersville University
Chair: **Mario Hiraoka**, Millersville University
11:30 Wil de Jong, New York Botanical Garden, **Christine Padoch**, New York Botanical Garden, Floodplain Agroforestry in the Peruvian Amazon;
11:50 Oliver Coomes, University of Wisconsin-Madison, Resource Extraction and Agricultural Production, Tahuayo River, Peruvian Amazon;
12:10 Miguel Pinedo-Vasquez, Yale School of Forestry & Environmental Studies, **Daniel Zarin**, Yale School of Forestry & Environmental Studies, **Peter Jipp**, Yale School of Forestry & Environmental Studies, Prospects for the Management of Communal Forest Reserves in Northeast Peru;
12:30 Mario Hiraoka, Millersville University, The Role of Swidden-Fallows in the Provision of Game: Examples from Amazonia.
12:50 Hilgard O'R. Sternberg, University of California, Berkeley, Catalan Entrepreneurs in Nineteenth Century Mato Grosso, Brazil.

1:25 pm to 3:05 pm

5103. Cartography Specialty Group: Ethics in Cartography Forum. Peel.
Organizer: **Laurence W. Carstensen**, Virginia Polytechnic Institute & State University
Chair: **Laurence W. Carstensen**, Virginia Polytechnic

Institute & State University
C. Peter Keller, University of Victoria;
Paul Pugliese, TIME Magazine;
George F. Jenks, University of Kansas;
Jack Dangermond, ESRI.

5104. Soviet and East European Specialty Group: Eastern Europe. Grand Ballroom East.
Organizer: **William H. Berentsen**, University of Connecticut
Chair: **William H. Berentsen**, University of Connecticut
1:25 Demetrius Dvoichenko-Markov, Monmouth College, Constantine Porphyrogenitus and the Great Trade Route from the Varangians to the Greeks;
1:45 Krassimira Paskaleva, Bulgarian Academy of Sciences, Theoretical and Methodological Issues in Bulgarian Regional Policy;
2:05 Branko Colakovic, Mankato State University, Implications of the Serbo-Croat Border in Yugoslavia.

5105. Migration: Third World. Wentworth.
Chair: **Barry Riddell**, Queen's University
1:25 Valerie Anderson, California State University-Sacramento, The Other Jet-Set;
1:45 Elizabeth M. Larson, University of Wisconsin-Milwaukee, Nicaraguan Refugee Absorption into the Costa Rican Economy;
2:05 Amrit Lall, University of Windsor, Squatters' Shanty Towns and Urban Planning Approaches in India: An Evaluation;
2:25 Jonathan S. Crush, Queen University, Migrancy, Housing and Industrial Relations in the South African Mining Industry;
2:45 Derek Shanahan, University of Minnesota, South Asian Immigration into Luton, 1950-1980.

5106. China Geography Specialty Group: China IV: Environmental Management. Grand Ballroom West, Section Z.
Organizer: **C.P. Lo**, University of Georgia
Chair: **Joseph B. Whitney**, University of Toronto
1:25 Shiu-hung Luk, University of Toronto, Soil Erodibility, Surface Crusting and Land Management in the Loess Plateau Region, North China;
1:45 Chang-ching Yu, University of Toronto, Land Resource Management in Loess Plateau, Gansu, China — A Preliminary Model of Aeam Approach;
2:05 Pingnan Yuan, University of Toronto, A Preliminary Investigation of Recent Desertification on the Southern Fringe of the Taklamakan Desert;
2:25 Hong-lie Qiu, Louisiana State University, Sea-Level and Coastal Tectonic History of Fujian, Southeast China.

5107. Political Geography and Contemporary Agriculture and Rural Land Use Specialty Groups: Agricultural Development, Agrarian Politics and the State II. Windsor West.
Organizers: **Frances M. Ufkes**, University of Iowa, **Howard F. Gregor**, University of California-Davis
Chair: **Alexander B. Murphy**, University of Oregon
1:25 Hans-Wilhelm Windhorst, Universitaet Osnabruck-Standort Vechta, Industrialization of US and West German Agriculture-A Comparative Study;
1:45 Howard F. Gregor, University of California-Davis, Urbanization in Californian Agricultural Industrialization and Implications for Resource Policy;
2:05 Werner Klohn, Universitaet Osnabrueck-Standort Vechta, Industrialized Agriculture and Land Use Conflicts.
Discussant: **Margaret FitzSimmons**, UCLA

5108. Asian Geography Specialty Group: Regional Conflict, Development and Trade in and with East Asia. VIP Room.
Organizer: **Gil Latz**, Portland State University
Chair: **Gil Latz**, Portland State University
1:25 Chiu-ming Luk, Hong Kong Baptist College, Prospects of Asian Economic Ties with China After the Beijing June 4 Incident;
1:45 Kenji K. Oshiro, Wright State University, Agricultural Production Policy in Japan and Trade: The Soybean;
2:05 David W. Edgington, University of British Columbia, The Geography of "Endaka"— Industrial Restructuring in Contemporary Japan.
Discussant: **David Kornhauser**, Portland State University, **Steven M. Banks**, Illinois State University.

5109. Recreation, Tourism and Sport Specialty Group: Recreation and Leisure II. York.
Organizer: **Paul F. Wilkinson**, York University
Chair: To Be Announced.
1:25 Robert S. Dilley, Lakehead University, **Ken Hartviksen**, Lakehead University, Wheels Across the Border: Tourist Travel From Thunder Bay to Duluth;
1:45 Robert C. Mings, Arizona State University, The Yellowstone National Park Vacation Orbit;
2:05 Paul F. Wilkinson, York University, Change in a Leisure-Dominated Community: Collingwood, Ontario;
2:25 Alan A. Lew, Northern Arizona University, Acculturation and Tourism on Native American Reservations.

5110. The Social Geography of the North American City, 1900-1940: II. Norfolk.
Organizer: **Richard Harris**, McMaster University
Chair: **Sherry Olson**, McGill University
1:25 Yda Schreuder, University of Delaware, Ethnic Division of Labor and Residence: Polish Immigrants in Wilmington, Delaware;
1:45 Anne E. Mosher, Louisiana State University, Boarding Arrangements in Pennsylvania Industrial Towns, 1900-1920;
2:05 Don Mitchell, Rutgers University, Building the Moral City: Language, Space and the Production of Order During the Depression in Johnstown, Pennsylvania.
Discussant: **Sallie A. Marston**, University of Arizona.

5111. Mathematical Models and Quantitative Methods SG: Spatial Econometrics and Spatial Statistics. Kent.
Organizer: **Serge Rey**, University of California-Santa Barbara
Chair: **Arthur Getis**, University of Illinois
1:25 Serge Rey, University of California-Santa Barbara, Luc Anselin, University of California, Santa Barbara, Spatial Econometric Analysis of Panel Data;
1:45 Raymond J. Dezzani, University of California-Riverside, The Spatial Autocorrelation Analysis of Location;
2:05 Yue-Hong Chou, University of California-Riverside, Effects of Weighting Functions on Spatial Autocorrelation.

5112. Human Rights and the Formation of an AAG Human Rights Specialty Group. Elgin.
Organizer: **Martin S. Kenzer**, University of Southern California
Chair: **Martin S. Kenzer**, University of Southern California
Joseph L. Scarpaci, Virginia Polytechnic Institute & State University;
Cheri Ragaz, University of Zurich;
Michael DeVivo, Oregon Institute of Technology;
Mark M. Miller, University of Southern Mississippi;
Robert L. Janiskee, University of South Carolina;

5113. Space and Social Transformation: Cases from Africa and Latin America. Conference C.
Organizer: **Garth A. Myers**, UCLA
Chair: **Benjamin Stein**, University of California, Los Angeles

1:25 Garth A. Myers, University of California, Los Angeles, Space and Social Transformation in Malindi: The Geography of "Postmodernization"?;
1:45 Kathryn E. Nava, University of California, Los Angeles, Conserving and Exploiting Tropical Forests: Costa Rican Forestry Reserves;
2:05 Susan E. Olson, University of California, Los Angeles, Space and Social Transformation in Northern Nigeria;
2:25 Bernard A. Dunayevich, University of California, Los Angeles, The Capital Importance: Changes in Argentinian Economic, Political and Social Space;
2:45 Benjamin Stein, University of California, Los Angeles, The Methodological Challenge: From Social Theory to Geographic Analysis.

5114. Diffusion Patterns in Religion. Oxford.
Chair: **Eliza Husband**, University of Illinois/Urbana-Champaign
1:25 Roger L. Henrie, Central Michigan University, The Diffusion of the Mormon Subculture into Other Culture Areas;
1:45 Clifford B. Craig, Utah State University, Contemporary Polygamous Lifestyles Within the Mormon Culture Region: Fundamentalists and Neo-fundamentalists;
2:05 Oscar H. Horst, Western Michigan Univ, The Diffusion of the Cult of the Guatemalan Black Christ of Esquipulas;
2:25 William R. Brown, Prairie View A&M University, The Nation of Islam: A Geographical Analysis of African-American Alienation;
2:45 Surinder M. Bhardwaj, Kent State University, Sentimental Journeys: Thoughts on the Nature of Pilgrimage.

5115. Third World Peasant Agriculture. Carlton.
Chair: **V. Chris Lakhan**, University of Windsor
1:25 Simon E. Carter, Centro Internacional de Agricultura Tropical, Geography of Cassava: A Perspective on Poverty and Environmental Degradation;
1:45 Mark O. Zweifler, Michigan State University, **Robert N. Thomas**, Michigan State University, Comparative Analysis of Small Scale Hillside Farming in the Dominican Republic;
2:05 Lawrence S. Grossman, Virginia Tech, Bananas, Crops, and Cows: Agricultural Change in St. Vincent;
2:25 Victoria A. Whitaker, University of Texas at Austin, Forsaking Sugar for Vegetables: Agricultural Development in Belize;
2:45 Robert Phillips, California State University-Sacramento, Rice-Fish Farming in Northern Malaysia.

5116. Urban Housing. Windsor East.
Chair: **Larry S. Bourne**, University of Toronto
1:25 Charles B. Monroe, The University of Akron, **Frank J. Costa**, The University of Akron, The Influence of Suburban Residential Development on Central City Housing Supply;
1:45 Brigitte Waldorf, Princeton University, Urban Housing Problems and Federal Housing Policies;
2:05 Thomas Harvey, Dept of Planning & Economic Development, St. Paul, The Multiple Listing Service and Real Estate Market Analysis;
2:25 Roman Cybriwsky, Temple University Japan, The Other Side of Tokyo: An Introduction to Arakawa Ward.

5117. Historical Geography of Influence. Conference D.
Chair: **Linda Mulligan**, Ohio State University
1:25 Ben A. Smith, Kansas State Univ, Universal Geographies of Morse (1784) and Goodrich (1842): A Comparison;
1:45 Andrew R. Bodman, University of Vermont, Small Worlds of Influence: Citation Structures in Contemporary Geography;
2:05 Teresa Dawson, McMaster University, Joining Trade Associations: British and Canadian Experiences Compared;
2:25 Glenn R. Miller, Bridgewater State College, The Geography of the U.S. English Movement;
2:45 Susan Brooker-Gross, Virginia Polytechnic Institute & State University, Geographic Pattern of US Newspapers, 1810-1840.

5118. Environmental Issues in Impact Assessment. Kenora.
Chair: **Bryn Greer-Wootten**, York University
1:25 Susan J. Elliott, McMaster University, **S. Martin Taylor**, McMaster University, **John Eyles**, McMaster University, **John Frank**, University of Toronto, **Stephen Walter**, McMaster University, **Murray Haight**, University of Waterloo, **Norman White**, McMaster University, **David Streiner**, McMaster University, **Dennis Willms**, McMaster University, Psychosocial Impacts of Exposure to Environmental Contaminants in Ontario;
1:45 Christopher Brown, Michigan State University, An Examination of a Distance Decay Function Relating Air Quality to Power Plant Sites;
2:05 Christopher J. Woltemade, University of Wisconsin-Madison, Environmental Impact Studies and Human Values:The Case of Two Forks Dam;
2:25 Susan C. Slowey, Texas A&M University, **Robert S. Bednarz**, Texas A&M University, The Effect of Floodplain Management on Property Value;
2:45 Rafal Serafin, University of Waterloo, **J. Gordon Nelson**, University of Waterloo, **Richard W. Butler**, University of Western Ontario, Research in Environmental Management and Planning: Three Case Studies.

5119. Education: General. Huron.
Chair: **Elaine F. Bosowski**, Villanova University
1:25 Victoria L. Rivizzigno, University of South Alabama, Defining Physical Geography: An Academic Necessity;
1:45 Jerry P. Schofer, Rutgers University, On the Geography of Higher Education in Latin America;
2:05 Douglas C. Munski, Univ of North Dakota, Sharing the Valley of the Red River of the North: Improving the Usage of the Theme of Movement in Curriculum for 7th Grade Social Studies;
2:25 Michael Bradford, University of Manchester, School Performance Indicators: The Effects of Neighborhood and Parental Choice;
2:45 Julie Elbert, University of Southern Mississippi, Changes in Map Location Scores in Introductory World Regional Geography Classes.

5120. Karst Systems and Hydrology of Carbonate Rocks. Conference B.
Chair: **Thomas E. Miller**, Indiana State University
1:25 Michael Day, University of Wisconsin-Milwaukee, Karst Valley Systems in the Napier Range, Western Australia;
1:45 Derek Ford, McMaster University, U-Series Dating of the Draining of an Aquifer;
2:05 Jongwoo Oh, University of Wisconsin, Milwaukee, **Michael Day**, University of Wisconsin-Milwaukee, Sinkhole Sediments and Soils in the Southwestern Wisconsin Karst;
2:25 Kathleen M. Vallmont, University of Delaware, **Thomas Meierding**, University of Delaware, Spatial Patterns of Marble Tombstone Weathering in Western Pennsylvania;
2:45 Philip P. Reeder, University of Wisconsin-Milwaukee, Preferential Dissolution of a Carbonate Aquifer: A Kentucky Example.

5121. Forest Resources. Conference E.
Chair: **Roger Needham**, University of Ottawa
1:25 Mark S. Wilson, Oregon State University, Old-growth Forests: Perceptions and Resource Allocation;
1:45 David E. Harper, University of Victoria, Considerations in

the Use of GIS to Assess Forestry Operations in California;
2:05 William Yaw Osei, Brandon University, Woodfuel and Deforestation;
2:25 Richard Alan Sambrook, Central Michigan University, **Robert N. Thomas**, Michigan State University, Social Implications of Deforestation in the Sierra Region of the Cordillera Central, Dominican Republic;
2:45 Fernando Echavarria, University of South Carolina, Quantifying Tropical Deforestation in the Huallaga River Valley of Peru.

5122. Population: General Session. Conference G.
Chair: **Patricia Gober**, Arizona State University
1:25 Greata Banda, University of Manitoba, Zambia's Adoption and Implementation of a Population Policy: A Local as well as a Global Challenge;
1:45 Gary Fuller, University of Hawaii, Population Age Structure Change in East Asia;
2:05 Claude Marois, Universite de Montreal, **Jean Pierre Thouez**, Universite de Montreal, Spatial Tendencies of Demographic Aging on the Island of Montreal, 1971-1986;
2:25 Liz Young, Vassar College, Changing Food Entitlements: A Comparative Analysis of Ireland and Scotland 1815-1845.

5123. Current and Future Program and Local Arrangements Committees: Meeting. Conference F.

5124. Floodplains: Process and Development. Dufferin.
Organizers: **Joe Desloges**, University of Toronto, **Michael C. Roberts**, Simon Fraser University
Chair: **Stanley W. Trimble**, University of Chicago
1:25 Joe Desloges, University of Toronto, Floodplain Development in a Wandering Gravel-Bed River, Bella Coola Valley, British Columbia;
1:45 Michael C. Roberts, Simon Fraser University, The Evolution of the Wandering Gravel-Bed Floodplain of the Lower Fraser River, British Columbia;
2:05 Peter Ashmore, University of Western Ontario, Braid Bar Sedimentation in Gravel-Bed Rivers;
2:25 Edward J. Hickin, Simon Fraser University, Squamish River Sediment: Sources, Storage, and Transport;
2:45 Dorothy E. Freidel, University of Oregon, Floodplain Development Through Vertical Accretion: Long Tom River, Western Oregon.

5125. Graduate School Forum. City Hall.
Organizers: **Julie Tuason**, Rutgers University, **Neal Devine**, Rutgers University
Chair: **Julie Tuason**, Rutgers University

5126. Cultural Landscape of Mountains. Grand Ballroom West, Section X.
Chair: **C.L. Salter**, University of Missouri
1:25 Jane Dorney, The Stone Wall Landscape of the Green Mountains;
1:45 Alice Andrews, George Mason University, Development in a Mountain County;
2:05 Tyrel G. Moore, University of North Carolina at Charlotte, Population Change and Regional Development in Appalachian Kentucky, 1870-1930;
2:25 C.L. Salter, University of Missouri, Alyson Greiner, University of Missouri, What Geographic Dynamics Lead to Hillside Cities and Hillside Residences?;
2:45 Claude W. Curran, Southern Oregon State College, Mountain Myths and Mountain Magic: A Mix of Traditional and New Age-Mt. Shasta, California.

5127. Land Use Planning in Developed Countries. Essex.
Chair: **Steven C. Bourassa**, Memphis State University
1:25 Peter Lucas, University of Utrecht, Land Use: Dynamics in Rural Urban Fringe Areas;
1:45 Dawn Hawley, Arizona State University, Public Agency Management of Urban Land Conversion in Metropolitan Phoenix;
2:05 Michael Spyrou, University of North Carolina at Wilmington, The Reshaping of the Small Town;
2:25 Richard Lamb, Center for Earth and Environmental Science, Fiscal Impacts of Rural Land Subdivisions in the Catskills;
2:45 Hubert B. Stroud, Arkansas State University, Problems Associated With the Overplatting of Lots in Lee County, Florida.

5128. Development Processes and the Local Community. Simcoe.
Chair: **Ann Markusen**, Rutgers University
1:25 Maureen G. Reed, University of Waterloo, Hinterland Communities and Sustainable Development;
1:45 Catherine A. Hooey, University of Western Ontario, The Effects of Industrialization on the Social Environment of Small Towns;
2:05 James E. Randall, University of Saskatchewan, "Minetown, Milltown, Railtown" Revisited: A Reinterpretation of the Economic Way-of-Life in Canadian Communities;
2:25 Lloyd E. Hudman, Brigham Young University, The Character and Nature of Educational Week Travel and its Impact upon the Local Community: A Case Study;
2:45 Henry A. Raup, Western Michigan University, Origins of Summer Visitors to Mount Desert Island, Main, 1881-1891.

5129. Geographic Thought II. Dominion South.
Chair: **Peter Hugh Nash Sr.**, University of Waterloo
1:25 Debra Straussfogel, Pennsylvania State University, The Evolutionary Synthesis: A Unified Theory for Human Spatial Systems;
1:45 Dagmar Reichert, Swiss Federal Institute of Technology, The End of Method;
2:05 Roger Miller, University of Minnesota, When Architecture Betrays Ideology: Post-modernism versus Social Democracy in Recent Building Projects in Stockholm;
2:25 Michael M. Bell, Yale University, The Natural Other: Evidence for a Geographical Social Psychology;
2:45 Peter Hugh Nash Sr., University of Waterloo, A Salient Aspect of "Sharing": From "Tomodachi" to Transnational Thought Mentors.

5130. GIS Specialty Group: Global Land Characterizations. Grand Ballroom Centre.
Organizer: **David A. Nystrom**, U.S. Geological Survey
Chair: **David A. Nystrom**, U.S. Geological Survey
1:25 Jerome E. Dobson, Oak Ridge National Laboratory, Coastwatch: A GIS Approach to Monitoring Change in Coastal Wetlands;
1:45 Lawrence E. Band, University of Toronto, Modelling Coniferous Watershed Processes at Large Spatial Scales;
2:05 Robert H. Alexander, U.S. Geological Survey, GIS and a Geographic Classic Revisited: Man's Role in Changing the Face of the Earth.

Stop by the Merrill/Macmillan booth!

Merrill points the way in geography...

with three exciting new titles for 1990!

GLOBAL PERSPECTIVES: A World Regional Geography, Second Edition

Charles A. Stansfield, Jr., and Chester E. Zimolzak; both Glassboro State College

First course students discover the excitement of regional geography through a new, full-color edition of this complete treatment of the physical geography, development, demographics, economics, culture, politics, and environment of major world regions. New in the Second Edition are a number of exciting features, including over 100 full-color world and regional maps; dozens of full-color photographs, tables, and graphs; and a wealth of boxed readings on such subjects as "Growing Up Soviet" and "Africa for Africans."

#20719-3: Casebound/688 pages

A GEOGRAPHY OF WORLD ECONOMY

Anthony R. deSouza

A comprehensive exploration of economic geography for introductory courses...one that captures and communicates the excitement and importance of economic geography in a rapidly changing world. An outstanding art program helps visually reinforce concepts.

#20565-4: Casebound/448 pages

PATTERNS ON OUR PLANET: Concepts and Themes in Geography

Susan Wiley Hardwick and Donald Gordon Holtgrieve; both, California State University, Chico

A new direction in introductory texts! This innovative new text offers an in-depth look at fundamental concepts in geography...focusing on the five classic geographic themes: Location, Place, People-Environment Interaction, Movement, and Region. Also appropriate for present and future geography teachers.

#21052-6: Casebound/416 pages

To remind you of these other Merrill Geography texts...

GEOGRAPHY AND DEVELOPMENT: A World Regional Approach, Third Edition
Edited by James S. Fisher, University of Georgia
#20942-0: Casebound/736 pages

THE CULTURAL LANDSCAPE: An Introduction to Human Geography, Second Edition
James M. Rubenstein, Miami University (Ohio)
#20950-1: Casebound/528 pages

APPLIED CARTOGRAPHY: Source Materials for Map Making
Thomas D. Rabenhorst, University of Maryland
Paul D. McDermott, Montgomery College
#20533-6: Paperback/168 pages

APPLIED CARTOGRAPHY: Introduction to Remote Sensing
Thomas D. Rabenhorst, University of Maryland
Paul D. McDermott, Montgomery College
#20633-2: Paperback/128 pages

INTERPRETATION OF TOPOGRAPHIC MAPS
Victor C. Miller (deceased)
Mary Westerback, Long Island University
#20919-6: Paperback/448 pages

GEOGRAPHY IN AMERICA
Edited by Gary L. Gaile, University of Colorado
Cort J. Willmott, University of Delaware
#20648-0: Casebound/800 pages

ON BECOMING A PROFESSIONAL GEOGRAPHER
Edited by Martin Kenzer, Louisiana State University
#20679-0: Casebound/400 pages
#20680-4: Paperback/400 pages

MERRILL
PUBLISHING COMPANY

For further information on these texts, or to request an examination copy for adoption consideration, stop by the Merrill/Macmillan booth.

III. FIELD TRIPS, WORKSHOPS, SPECIAL EVENTS

Field Trips

Note: All field trips and site visits leave from the Sheraton Centre Hotel at the departure times indicated; return times are approximate.

1. Northern Ontario

When: leave Sunday, April 15, 1:00pm - return Wednesday, April 18, late afternoon
Cost: $265 (includes double-occupancy accommodation and admissions; meals extra)
Capacity: 9
Organizer: Fred Helleiner, Trent University

This field trip takes participants northward through old Ontario and into the Precambrian Shield, to the Sudbury Basin and further on to Cobalt, Kirkland Lake, and New Liskeard, and across the provincial line to Rouyn-Noranda, Quebec. Mining and forest activity, plus farming in the Clay Belt, will be observed. Points of interest to biogeographers and historical geographers will be visited, and differences noted in this region where Canada's two major language groups come together.

2. Agriculture in Southwestern Ontario

When: leave Tuesday, April 17, 8:00am - return Wednesday, April 18, late afternoon
Cost: $97 (includes double-occupancy accommodation and lunch; breakfast and dinner extra)
Capacity: 45
Organizer: Michael Troughton, University of Western Ontario

Rural land uses and agricultural landscapes are the focus of this trip. From Waterloo through to London and on southwestward is the heart of modern agribusiness in Ontario. Several site visits are included.

3. New Religious Patterns

When: Wednesday, April 18,
Cost: $24
Capacity: 45
Organizer: Allan Gleason, Linguistics, University of Toronto

Trip participants will be introduced to the great variety of religious expression in Toronto, closely tied to the broad ethnic diversity found in the city. The trip will focus on mainline church adjustment to new urban situations, storefront churches, new suburban structures, and the Jewish community along Bathurst Street.

4. The Urban-Rural Fringe

When: Wednesday, April 18, 8:30am-6:30pm
Cost: $35
Capacity: 45
Organizer: Robert Gale, University of Toronto

This field trip focuses on agriculture and tourist sites between Toronto and the Region of Waterloo, 150 km to the northwest. The Ontario Agricultural Museum, Milton, and the Mennonite farming area, around Elmira, receive special attention.

5. Erosional Processes and Lake Bluff Retreat

When: Thursday, April 19, 7:30 am-5:00pm
Cost: $25 (lunch extra)
Capacity: 40
Organizers: Rorke Bryan and Brian Greenwood, University of Toronto-Scarborough Campus

This tour focuses on the geomorphic and hydrologic processes active along the Scarborough Bluffs. This landform, extending some 15 km along the north shore of Lake Ontario and more than 100 metres high in places, is retreating more than one metre annually. Participants will receive a briefing at the new Soil Erosion Labratory, Scarborough College Campus. A traverse along the Bluffs follows, with attention given both to geomorphological and landuse planning aspects of bluff retreat.

7. The Vernacular Landscape

When: Thursday, April 19, 8:30am-6:00pm
Cost: $40 (includes catered lunch)
Capacity: 45
Organizer: Thomas McIlwraith, University of Toronto-Erindale Campus

Participants will seek out the ordinary nineteenth-century landscape of rural and small town Ontario on, and beyond, Toronto's western suburbs. The tour makes a traverse from Oakville, on Lake Ontario, up over the Niagara Escarpment and on towards Guelph, with several walking stops.

8. The Niagara Escarpment: Biogeography and Geomorphology

When: Thursday, April 19, 8:30am-6:00pm
Cost: $31 (includes box lunch)
Capacity: 45
Organizer: Tony Davis and Joe Desloges, University of Toronto

Participants on this trip will examine Holocene environments of the Niagara Escarpment north of Hamilton. The escarpment forms the eastern rim of the Michigan Basin and represents a major physiographic element in the development of the Southern Ontario landscape. Stops will be made to demonstrate the sedimentary geology of the Escarpment, modifications due to Quaternary glaciations, landforms related to groundwater and surface erosion, and modern vegetation associations.

9. Ontario Centre for Remote Sensing

When: A Thursday, April 19, 8:30am-11:30am
B Thursday, April 19, 1:30pm-4:30pm
Cost: $5
Capacity: 20 each trip
Organizer: Nigel Roulet and Colleagues, York University

OCRS houses a wide variety of material, from air-photos to satellite imagery, and is actively involved in image processing. This tour includes the opportunity for hands-on computer experience. Public transit fare not included. Purchase of TTC pass is recommended (see check off item on registration form).

10. Toronto's Financial District

When: Thursday, April 19, 9:00am-1:00pm
Cost: $10
Capacity: 30 each trip
Organizer: Gunter Gad, University of Toronto-Erindale Campus

Take a 2-kilometer walk through the city's—indeed, the nation's—financial heart. Remnants of Toronto's civic core of the early 19th century, and its wholesale and retail centre of the late 19th century, still are visible in the current streetscapes dominated by office buildings dating from the 1890s through to the present. Specialization in land use is more visible than the increasing specialization of economic sectors within office buildings. Attempts to reintroduce mixed land use and building forms more amenable to street life will be critically examined. Public transit fare not included. Purchase of TTC pass recommended (see check off item on registration form).

11. Queen's Park: The Ontario Legislature
When: Thursday, April 19, 1:00pm-4:00pm
Cost: $5
Capacity: 50
Organizer: Peter Adams, Trent University, and Member of the Legislature for Peterborough

Queen's Park is the centre of government for the Province of Ontario, with a bureaucracy employing thousands. If parliament is in session, a visit to the legislative chamber for Question Period may be included in this trip. Queen's Park is one mile from the Sheraton Hotel, northward through the University Avenue office and hospital district. Public transit fare not included. Purchase of TTC pass recommended (see check off item on registration form).

12. Toronto's Changing Waterfront
When: Thursday, April 19, 1:30pm-5:00pm
Cost: $29
Capacity: 45
Organizer: Roy Merrens and Glen Norcliffe, York University

This field trip will observe the diversity of current redevelopment that is transforming all parts of Toronto's waterfront; the Harbourfront project is only one aspect. Consideration will be given to the unique features of Toronto's waterfront redevelopment, as well as to those characteristic of other cities.

13. Inner City and Suburban Office Nodes
When: Thursday, April 19, 2:00pm-6:00pm
Cost: $25
Capacity: 40
Organizer: Gunter Gad, University of Toronto-Erindale Campus

This field trip makes a traverse from the financial district, through smaller office concentrations in high-income residential areas, to large suburban office complexes. Occupancy patterns and employment characteristics vary from node to node. The absence of office buildings in blue collar sectors, and the recent spread of offices into downtown railway and industrial areas will be observed.

14. Social Housing in Toronto
When: Friday, April 20, 1:30pm-5:30pm
Cost: $27
Capacity: 45
Organizer: John Hitchcock, University of Toronto

This tour focuses on Toronto's public housing, examining the variety of types of accommodation and attempts at the formation of communities.

15. The Western Inner City
When: Friday, April 20, 2:00pm-6:00pm
Cost: $5
Capacity: 30
Organizer: Jim Lemon, University of Toronto

This walking tour includes King Street West (where entertainment is invading an old warehouse area), the needle district, Chinatown, Alexandra Park public housing, Kensington Market and the Spadina retail-wholesale district; it ends at a pub near Spadina and College, on the edge of the University of Toronto campus.

16. Teacher Field Trips
When: A Friday, April 20, 9:30am - 12:00 noon
B Friday, April 20, 1:30pm-3:30pm
C Saturday, April 21, 1:30pm-3:30pm
Cost: $5
Capacity: 30
Organizer: Lorraine Clarkson, Toronto Urban Studies Centre, Toronto Board of Education

These participatory field trips, designed for secondary school teachers seeking enriched urban studies courses, will appeal to all interested in honing their observational skills. "A Visit to the New Educational Technological Laboratory" at the Toronto Urban Studies Centre (Friday morning) observes first hand how computers arranged at "learning stations" are being used to complement the secondary school geography curricula. "Towers in View" (Friday afternoon) explores the old Town of York, east of the financial district; "Voice from the Past" (Saturday) is conducted through the eyes of a child living in Toronto in 1855.

17. Historical Margin of Downtown
When: Saturday, April 21, 9:00am-12:00noon
Cost: $5
Capacity: 20
Organizer: John Warkentin, York Univeristy

Participants in this walking tour will wind their way in and out of side streets as they explore the one-time lakefront area of early 19th-century Toronto between the central business district and the vicinity of old Fort York.

Downtown Toronto Underground
Free guide with registration
Organizer: City of Toronto

Beneath downtown Toronto lies an extensive mall occupied by hundreds of retailers. The labyrinth of avenues has been put in place during the past quarter century, and now extends south to Front Street and North to Dundas. Follow the guide given at registration and begin your own tour directly from the Sheraton Centre.

City to Suburb: A Cross-section
Free manual with registration
Organizer: Ted Relph, University of Toronto-Scarborough

This self-guiding expedition combines city streetcar and bus travel with frequent walkabouts, and narrates the changing cityscape from downtown through a succession of neighbourhoods to the suburban City of Scarborough, 15 miles eastward. Allow a half day for the complete tour; parts may be done separately.

Blackwell

The Capitalist Imperative
Territory, Technology and Industrial Growth
MICHAEL STORPER and RICHARD WALKER
$18.95 paper
$54.95 352 pages

The Condition of Postmodernity
An Enquiry into the Origins of Cultural Change
DAVID HARVEY
"Devastating. The most brilliant study of postmodernity to date." —Terry Eagleton
$16.95 paper
$49.95 320 pages

The Informational City
Information Technology, Economic Restructuring, and Urban-Regional Development
MANUEL CASTELLS
$45.00 cloth 448 pages

The Holocene
An Environmental History
NEIL ROBERTS
"(A) concise, scholarly and remarkably well-written account of the past 10,000 years, since the close of the last ice age." —*New Scientist*
$19.95 paper
$60.00 220 pages

The Humane City
Cities as if People Matter
JOHN R. SHORT
$14.95 paper
$42.95 160 pages

Changing the Face of the Earth
Culture, Environment, History
I.G. SIMMONS
"The book should become a classic text for geographers who want to know more about the torturous relationship between human tenure, economy and the natural world." —*Times Higher Education Supplement*
$19.95 paper
$79.95 496 pages

Global Freshwater Quality
A First Assessment
Edited by MICHAEL MEYBECK, DEBORAH CHAPMAN and RICHARD HELMER
Commissioned by the U.N. Environment Program and the World Health Organization
$64.95 paper 356 pages

Remodelling Geography
Edited by BILL MACMILLAN
$55.00 cloth 352 pages

Population and Disaster
Edited by JOHN I. CLARKE, PETER CURSON, S.L. KAYASTHA and PRITHVISH NAG
$49.95 cloth 352 pages

Rural Change and Development in Tropical Africa
KEN SWINDELL and DAVID SIDDLE
$47.95 cloth 288 pages

NEW IN PAPERBACK

Cities of Tomorrow
An Intellectual History of Urban Planning and Design in the Twentieth Century
PETER HALL
"A most readable tour de force, which makes a whole series of fascinating connections." —*The Architectural Review*
$17.95 paper 480 pages

Uneven Development
Nature, Capital and the Production of Space
Revised edition
NEIL SMITH
"An important contribution to the critical study of relations between society, space and nature." —*Regional Studies*
$14.95 paper 198 pages

The Capitalist City
Global Restructuring and Community Politics
Edited by MICHAEL PETER SMITH and JOE R. FEAGIN
$16.95 paper 400 pages

Basil Blackwell, Inc.
3 Cambridge Center, Cambridge, MA 02142
TOLL-FREE ORDERING (800) 445-6638

Workshops

1. Macintosh Mapping for Professional Publication

(Sponsored by Cartography Specialty Group)
When: Wednesday, April 18, 8 am - 12 noon; 1 pm - 5 pm
Where: York University
Cost: $45
Capacity: 25
Organizer: Judy M. Olson, Michigan State University
Leaders: William A. Bowen, California State University, Northridge; Dennis Fitzsimons, Southwest Texas State; Frank Gossette, California State University, Long Beach; Judy M. Olson, Michigan State University; Eugene Turner, California State University, Northridge; David DiBiase, Pennsylvania State University.

Microcomputer software is becoming increasingly useful for creating graphics for professional journals such as the *Annals of the AAG* and *The Professional Geographer*. Hands-on experience will be offered on a Macintosh system equipped with Freehand, Superpaint, and MapMaker or similar programs. Design of and standards for journal graphics will be discussed. Cartographic service lab personnel as well as potential authors of articles are encouraged to attend. Participants are not expected to have any previous experience with the software but should be familiar with basic mouse operation and the opening and closing of files on the Mac.

2. Digital Processing of Remotely Sensed Data

(Sponsored by Remote Sensing Specialty Group)
When: Wednesday, April 18, 8:00 am - 12 noon and Thursday, April 19, 11:30 am - 1:30 pm (all participants); and group sessions:
A: Wednesday, April 18, 1:00 - 4:30 pm
B: Wednesday, April 18, 4:30 - 8:00 pm
C: Thursday, April 19, 8:00 - 11:30 am
Where: Sheraton
Cost: $75
Capacity: 15 (5 per section)Tina Cary, EOSAT
Leaders: Shamim Naim, University of Wisconsin-Waukesha; Jeff Olsenholler, University of Maryland; David P. Lusch, Michigan State University

The objective of this workshop is to provide an introduction to digital image processing. Participant is expected to be familiar with the electromagnetic spectrum and matter–energy interactions. Those topics will be only briefly reviewed in the introduction. The steps in data analysis will be introduced in lectures; then participants will form teams to conduct an analysis on a microcomputer. Finally, the group will re-convene to compare and discuss analysis results.

3. Mapping and More Using TIGER/Line Files

(Sponsored by Cartography Specialty Group)
When: Wednesday, April 18, 8:30 am - 5:00 pm
Where: Ryerson
Cost: $40
Capacity: 30
Organizer: Ann Goulette, US Bureau of the Census
Leaders: Frederick R. Broome, US Bureau of the Census; Amy Bishton, US Bureau of the Census; Ramala Basu, US Bureau of the Census; Donald Cooke, Geographic Data Technology, Inc.; Said Khosrowshahi, GIS Corporation

This workshop is designed to introduce geographers to the potential uses of TIGER/Line files, the publicly released version of the TIGER file the U.S. Bureau of the Census is using for the 1990 Decennial Census. Among the lecture topics covered will be the contents and structure of the file. In addition, commercially available and Census in-house software applications using the files will be demonstrated. A portion of the workshop will be reserved to allow participants to experiment with demonstrated software. Participants will receive Census software and a sample county data file on diskette. As prerequisites, experience with computer programming and data structures would be helpful but not necessary.

4. Elements of Map Critique

(Sponsored by Cartography Specialty Group)
When: Thursday, April 19, 8 am - 12 noon
Where: Sheraton Centre
Cost: $30
Capacity: 30
Organizer: Andrew J. Wahll, National Geographic Society
Leaders: Andrew J. Wahll, National Geographic Society; Philip Gersmehl, University of Minnesota; Sona Andrews, University of Wisconsin-Milwaukee; Brian Harley, University of Wisconsin-Milwaukee; Paul J. Pugliese, Time Magazine; Mark Warhus, University of Wisconsin-Milwaukee

The workshop objective is to convey elements of cartographic critique so that participants will be more knowledgeable in the assessment and appreciation of past, present and future cartography. The session will include 1) general discussion of the elements of maps and their interaction on a sheet of paper. This includes cartographic principles, techniques, conventions and traditions. 2) Individual participation in groups that will critically study published maps of differing scales and content. 3) Reconvening of groups with discussion of participant critiques will stimulate thinking by sharing of information and perspectives. Map material will be provided by the organizer. Tentative topics include: magazine maps, tactual cartography, map supplements, discovery maps, map exhibits and map reading.

5. Using Third World Films to Teach Regional Geographies

When: Thursday, April 19, 9 am - 12 noon; 1:30 pm - 4:30 pm
Where: Sheraton Centre
Cost: $25
Capacity: 20
Organizer: Gerald M. Macdonald, Villanova University

The objectives of this workshop are to acquaint geographers with third world film and to show how it can be used in the geography curriculum. Part one will cover the practical aspects — distribution, availability, and literature — of using these films. Participants will be provided with bibliographies and lists of distributors. Part two will cover the specific advantages to using fictional films and discuss themes, relationships and geographic/spatial concepts that can be reinforced through the use of third world films. Part three will involve watching two third world films and discussing the way these might be used in a variety of geography classes.

6. Intergovernmental Relations: Within and Across Governmental Hierarchies

(Sponsored by IGU Commission on Geography and Public Administration; IGU Commission on the World Political Map; Political Geography Specialty Group)
When: Wednesday, April 18, 9 am - 5 pm
Where: Sheraton Centre

Cost: $18
Capacity: 50
Organizer: Rex Honey, University of Iowa
Leaders: Max Barlow, Concordia University; John Mercer, University of Victoria; C. Murray Austin, University of Northern Iowa

Top scholars in political geography will discuss the latest research in dealing with intergovernmental relaions, particularly but not wholly with regard to sharing the North American continent. One set of speakers will address central/local relations within the Canadian, American and British administrative systems. A second set of speakers will address relations across national boundaries, particularly between the U.S. and Canada and within the European Community. The workshop will include three paper sessions, two in the morning and one in the afternoon, followed by a structured discussion.

7. Making of a Biblical Atlas

(Sponsored by Geography and the Bible Specialty Group)
When: Saturday, April 21, 7 pm - 10 pm
Where: Sheraton Centre
Cost: $35
Capacity: 35
Organizer: Jonathan J. Lu, University of Northern Iowa
Leaders: Barry J. Beitzel, Trinity Evangelical Divinity School

The purpose of this workshop is to share with fellow geographers the experience of making an atlas, especially a biblical atlas. Using *The Moody Atlas of Bible Lands* as an example, the author of this atlas will discuss 1) the research and the proposal, 2) finding a publisher and consultants, 3) compilation of maps and texts, 4) copyrighted materials, 5) execution and cartographic services, 6) publicity and marketing the product, 7) the art of swallowing criticism. Cost of the workshop includes a copy of the *Atlas* (retail value $33.95).

Special Events

A Night on the Town: Theatre and Baseball Night

When: Friday, April 20, evening

1. Toronto Blue Jays vs. Kansas City Royals
When: 7:30 pm
Where: Toronto's Skydome
Cost: $15

2. Phantom of the Opera **SOLD OUT**
When: 8:00 pm
Where: Pantages Theatre, Yonge Street
Cost: $45 (mezzanine)

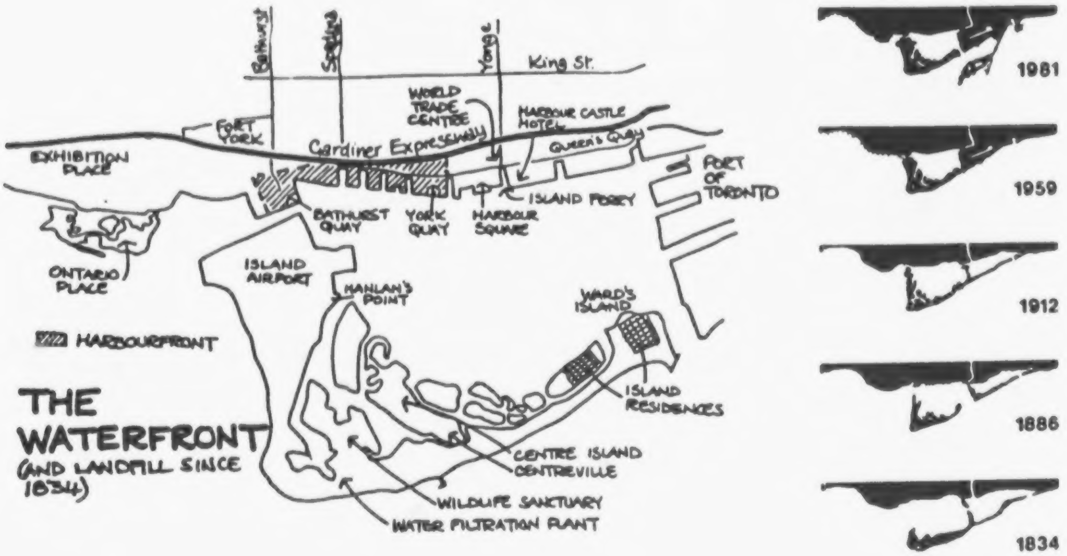
3. Les Miserables
When: 8:00 pm
Where: Royal Alexandra Theatre, King Street West
Cost: $50 (orchestra)

4. La Rondine (presented by the Canadian Opera Company)
When: 8:00 pm
Where: O'Keefe Centre, Yonge and Front Streets
Cost: $37

Annual Meeting Banquet

When: Saturday, April 21, 8 pm - 10:30 pm
Where: Sheraton Centre
Cost: $30
Speaker: David Ward, University of Wisconsin–Madison

AAG distinguished service honors will be announced after dinner, followed by a presentation by AAG Past President David Ward, titled "Social Reform, Social Surveys and the Discovery of the Modern City". A reception with cash bar begins at 7 pm.


THE WATERFRONT
(AND LANDFILL SINCE 1834)
▨ HARBOURFRONT
Bathurst
Spadina
Yonge
King St.
FORT YORK
EXHIBITION PLACE
Gardiner Expressway
WORLD TRADE CENTRE
HARBOUR CASTLE HOTEL
Queen's Quay
PORT OF TORONTO
ISLAND FERRY
BATHURST QUAY
YORK QUAY
HARBOUR SQUARE
ONTARIO PLACE
ISLAND AIRPORT
HANLAN'S POINT
WARD'S ISLAND
ISLAND RESIDENCES
CENTRE ISLAND
CENTREVILLE
WILDLIFE SANCTUARY
WATER FILTRATION PLANT
1981
1959
1912
1886
1834

CREATING THE NORTH AMERICAN LANDSCAPE

Gregory Conniff, Bonnie Loyd, and David Schuyler, consulting editors

Through innovative works in history, geography, and photography this series will explore the landscapes of North America and examine how they evolved. Books in the series stress the links between the land and the people who changed it — from the woodsmen, pioneers, and architects who shaped the land to the artists who shape the way we see it.

FORTHCOMING

BRAVO 20

The Bombing of the American West

Richard Misrach and Myriam Weisang Misrach

Landscape photographer Richard Misrach documents the devastation of Bravo 20 in Nevada, illegally used as a high explosive bombing range by the United States Navy for over 30 years. *Bravo 20* provides the history of the site and a proposal to convert the bombing range into the first environmental memorial in the United States.

THE ROUGH ROAD TO RENAISSANCE

Urban Revitalization in America, 1940-1985

Jon C. Teaford

Teaford examines the struggles of politicians, planners, and citizens as they tried to save their declining cities. While glass office towers and "festival marketplaces" were built a few blocks from abandoned tenements and adult bookstores, "urban renaissance" turned out to be an elusive goal.

THE SPANISH AMERICAN HOMELAND

Four Centuries in New Mexico's Rió Arriba

Alvar W. Carlson

Since Spaniards settled in the Rió Arriba four hundred years ago, Spanish Americans have called it their cultural and spiritual home. Carlson describes the history of the land: its harsh environment, subsistence agriculture, land grant programs, and the intrusion of Anglo-American culture.

ALREADY PUBLISHED

THE CITY BEAUTIFUL MOVEMENT

William H. Wilson

Winner of the 1989 Lewis Mumford Prize. Named the most outstanding book in Architecture and Urban Planning by the Association of American Publishers.

$38.50 *hardcover*

THE AMERICAN BACKWOODS FRONTIER

An Ethnic and Ecological Interpretation

Terry G. Jordan and Matti Kaups

$36.00 *hardcover*

THE
JOHNS
HOPKINS
UNIVERSITY PRESS

NEW

THE CONTINUING CITY

Urban Morphology in Western Civilization

James E. Vance, Jr.

First published as *This Scene of Man* in 1977, Vance's humanistic study of the physical form and cultural geography of cities is now available with updated material, a new introduction, and additional illustrations.

$22.95 *paperback* $50.00 *hardcover*

CAPTURING THE HORIZON

The Historical Geography of Transportation since the Sixteenth Century

James E. Vance, Jr.

"Vance has brought together a truly impressive body of material on the development of transportation that has never before been integrated, and all students of transportation are in his debt." — William H. Wallace, *Professional Geographer*

$26.95 *paperback*

SINCE "MEGALOPOLIS"

The Urban Writings of Jean Gottmann

edited by Jean Gottmann and Robert A. Harper

$14.95 *paperback* $36.00 *hardcover*

NATURAL HAZARDS

An Integrative Framework for Research and Planning

Risa I. Palm

$32.50 *hardcover*

FORTHCOMING

THE BETWEENNESS OF PLACE

Toward a Geography of Modernity

A. Nicholas Entrikin

GREENWAYS FOR AMERICA

Charles E. Little

THE PAPERS OF FREDERICK LAW OLMSTED

Volume V: The California Frontier, 1863-1865

edited by Victoria Post Ranney, Gerard J. Rauluk, and Carolyn F. Hoffman

SOIL CONSERVATION IN THE UNITED STATES

Policy and Planning

Frederick R. Steiner

See our books at Booth 212

THE JOHNS HOPKINS UNIVERSITY PRESS

701 West 40th Street, Suite 275
Baltimore, Maryland 21211

To order, call **1-800-537-JHUP**

IV. INDEXES

Tuesday 1-6; Wednesday 1000; Thursday 2000; Friday 3000; Saturday 4000; Sunday 5000

Sponsoring Organizations

Association of American Geographers **4144, 4145, 4147**
Affirmative Action and Minority Status 2017, 4028, 5012
Archives and Association History Committee 3057, 3091, 3121, 3157, 4061, 4092, 4122, 5019, 5053, 5084
Council 5, 1001
Department Chairs 2015
Executive Committee 3
Future Local Arrangement and Program Committees 5123
International Research and Scholarly Exchange Committee 2061
Nystrom Award Committee 3005, 3115
Phoenix Group 2043, 3074
Presidential Plenary 3038, 4041
Status of Women in Geography Committee 2045

Other Organizations:
Antipode 5048
Conference of Latin Americanist Geographers 2049
FIPSE 4016
Gamma Theta Upsilon 2044
Geo-Energy 5006
Geographical Analysis 2034
IGC Publications Committee 4001
IGU Commission on Mathematical Models 4030
IGU Commission on Geography and Public Administration 1008, 2060
IGU Commission on the World Political Map 1008, 2062, 3056, 3090, 3120, 3156, 4044
National Council for Geographic Education 4, 6, 1004
National Center for Geographic Information and Analysis 4124
National Science Foundation 3095, 3172
Ontario Association for Geographic and Environmental Educators 4047
Office of the Geographer, U.S. Department of State 4101
Projet Louisiane 5071
University of Illinois 3068
US National Committee of the IGU 2004

AAG Specialty Groups:
Africa 4134
Aging and Aged 3044, 3047, 4103, 4130
Applied 3049, 3084, 3142, 3166, 5039, 5043, 5073
Asian 2026, 3034, 3069, 3155, 3176, 4046, 4095, 5007, 5044, 5079, 5108
Bible 4081, 4114, 4146
Biogeography 2027, 3007, 3060, 3167, 4015, 4065, 4098, 4126, 5005
Canadian 3066, 3111, 3112, 3176, 4046, 4052, 4085, 4116, 4135
Contemporary Agriculture and Rural Land Use 2053, 3066, 3081, 3116, 3147, 4087, 4118, 5076, 5107
Cartography 1002, 1006, 2016, 2036, 3078, 3117, 4048, 5065
China 3124, 3160, 3176, 4046, 4102, 4136, 5056, 5106
Climate 2052, 3050, 3096, 3125, 4013, 4053, 4058, 4065, 4067, 4092, 4098, 4122, 4126, 4127, 5005, 5020, 5054
Coastal and Marine 3089, 3119, 3154, 4137, 5084
Cultural Ecology 3022, 3080, 3168, 4009, 4012, 4057, 4059, 4089, 4091, 4097, 4121, 5009, 5046
Cultural Geography 2065, 3056, 3086, 3090, 3120, 3156, 4097, 5018, 5019, 5053, 5066
Energy and Environment 3150, 4034, 4052, 4058, 4059, 4085, 4090, 4091, 4116, 4121, 5015
Environmental Perception and Behavioral 3056, 3090, 3120, 3156, 3169, 4055, 5030, 5041, 5068
Geomorphology 3070, 3092, 3119, 3122, 3154, 3158, 4025, 4043, 4111, 4127, 5009, 5046, 5084

Critical Landscapes from Chicago Booth 106

GEOGRAPHY & RELATED

GEOGRAPHY, RESOURCES, AND ENVIRONMENT

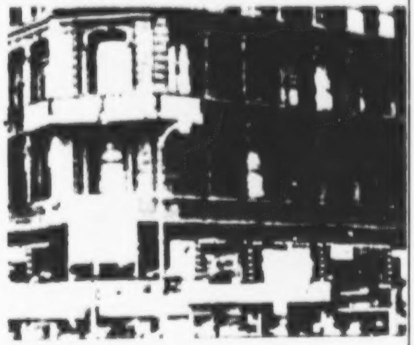
Edited by Robert W. Kates and Ian Burton

Volume 1: Selected Writings of Gilbert F. White

Paper $25.00 486 pages
23 line drawings, 4 maps
Library cloth edition $65.0

Volume 2: Themes from the Work of Gilbert F. White

Paper $18.95 392 pages
25 line drawings
Library cloth edition $45.00



THE MAN-MADE CITY

The Land-Use Confidence Game in Chicago

Gerald D. Suttles

For Chicago, as for other cities, new ways of managing the urban environment are now much more than civic beautification; they are the means to survival. Focusing on several case histories, Suttles offers an irreverent, highly critical guide to both the realities and myths of land-use planning and development in Chicago from 1976 through 1987.

Cloth $24.95 336 pages
12 halftones, 12 line drawings, 8 maps, 6 tables

THE MODERNIST CITY

An Anthropological Critique of Brasília

James Holston

Paper $22.50 392 pages 46 halftones, 34 line drawings, 17 tables, 10 maps
Library cloth edition $50.00

CULTURAL EXCURSIONS

Marketing Appetites and Cultural Tastes in Modern America

Neil Harris

These wide-ranging essays offer a fresh look at the social history of art and architecture; the changing modern landscape, including shopping malls and parking garages; and urban design.

Paper $19.95 (est.) 424 pages (est.) Illus.
Library cloth edition $55.00 July

AMERICAN APOCALYPSE

The Great Fire and the Myth of Chicago

Ross Miller

"A startling accomplishment. . . . Miller's analysis of the meaning of the Great Fire, and of the crucial decades of rebuilding, is the kind of social/cultural history that can revive your faith in the future of criticism in America."—Frank McConnell, University of California, Santa Barbara

Cloth $24.95 248 pages (est.) 75 halftones

ZONING AND THE AMERICAN DREAM

Promises Still to Keep

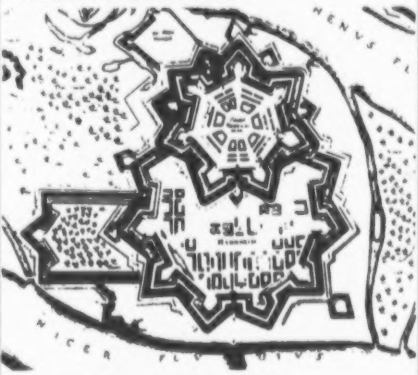
Edited by Charles M. Haar and Jerold S. Kayden

Cloth $39.95 398 pages
Distributed for the American Planning Association/Planners Press

THE BEST OF *PLANNING*

Two Decades of Articles from the Magazine of the American Planning Association

Cloth $65.00 628 pages Illus.
Distributed for the American Planning Association/Planners Press



URBAN DESIGN IN WESTERN EUROPE

Regime and Architecture, 900-1900

Wolfgang Braunfels

Translated by Kenneth J. Northcott

Paper $24.95 424 pages 190 halftones

CARTOGRAPHY

FROM SEA CHARTS TO SATELLITE IMAGES

Interpreting North American History through Maps

Edited by David Buisseret

Twelve original essays explore various map types that have been widely used in the United States, from colonial times to the present, demonstrating how each map can be interpreted and used today.

Paper $29.95 (est.) 332 pages (est.)
8 color plates, 142 halftones,
71 line drawings Library cloth edition $75.00

MAPS WITH THE NEWS

The Development of American Journalistic Cartography

Mark Monmonier

This lively assessment of the role of cartography in American journalism traces the use of news maps in newspapers and magazines and on television from the eighteenth century to the 1980s.

Cloth $24.95 348 pages Illus.

THE HISTORY OF CARTOGRAPHY

Volume 1: Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean

Edited by J. B. Harley and David Woodward

"A first-rate achievement. . . . It is plainly destined for the 'indispensable standard work' category."—Peter Clark, *Geographical Magazine*

Cloth $100.00 622 pages 40 color plates, 240 halftones

Volume 2: Cartography in the Traditonal Islamic and Asian Societies

Forthcoming 1991

CARTOGRAPHY IN FRANCE, 1660-1848

Science, Engineering, and Statecraft

Josef Konvitz

Foreword by Emmanuel Le Roy Ladurie

Cloth $39.95 224 pages
8 page color gallery, 28 maps

ART AND CARTOGRAPHY

Six Historical Essays

Edited by David Woodward

Cloth SPECIAL PRICE $39.00
(list price $65.00) 282 pages
34 color plates, 183 halftones

20% Meeting Discount*

**Does not apply to titles with Special Prices*

The University of Chicago Press 5801 South Ellis Avenue Chicago IL 60637

Geographic Perspectives on Women 2065, 3031, 3149, 3175, 4006, 4054, 4080, 4119
Hazards 3059, 3094, 4009, 4059, 4091, 4121, 5041, 5082
Higher Education 3044, 4083, 4138
Historical 3008, 3111, 3165, 3176, 4046, 4059, 4080, 4091, 4121, 4125, 5029, 5098
Industrial 2011, 2023, 2056, 3118, 3152, 4011, 4094, 4123
Latin American 3056, 3090, 3120, 3156, 4012, 4139, 5014, 5049, 5101
Medical 3020, 3055, 4032
Microcomputers 3032, 5016, 5051
Mathematical Models and Quantitative Methods 2047, 3076, 3098, 3113, 3127, 3161, 4030, 4063, 4140, 5057, 5111
Native American 2057, 3022, 3054, 3056, 3080, 3090, 3120, 3156
Political 1008, 3042, 3071, 3085, 3128, 3175, 4011, 4035, 4044, 4117, 5017, 5045, 5052, 5076, 5083, 5107
Population 3047, 3061, 3097, 3126, 3170, 4014, 4074, 4082, 4129
Recreation, Tourism and Sport 2058, 3043, 4052, 4056, 4085, 4116, 5042, 5080, 5109
Regional Development and Planning 2022, 2046, 3155, 4051, 4062, 4093, 5043
Remote Sensing 1005, 2002, 3104, 3151, 4064, 4096, 4141, 5011
Rural Development 3066, 4036, 4052, 4085, 4116, 5008
Soviet and East European 3058, 3123, 3171, 4006, 4066, 4110, 4115
Socialist 3041, 3042, 3071, 3083, 3149, 3175, 4050, 4057, 4062, 4086, 4089, 4142, 5013, 5048, 5067
Transportation 3046, 4033
Urban 2010, 2059, 3006, 3048, 3082, 3148, 3175, 4008, 4045, 4050, 4088, 4119, 5043, 5067, 5068
Water Resources 3033, 3044, 3096, 3112, 3125, 4010, 4053, 4059, 4079, 4091, 4121, 5083

Subject Index

Africa 3009, 3075, 5113
Aging 4103, 4130
Agrarian Politics 5076, 5107
Agriculture 3028, 3116, 3133, 3143, 4020, 4070, 5010, 5028, 5047, 5059, 5077, 5115
Applied 3049, 3084, 3113, 3142, 4071, 5094
Asia 3155, 4069, 4120
Biogeography 2027, 3007, 3060, 3129, 3135, 4015, 4017, 4104, 4131, 5005
Bioregional 2048
Canada 3067, 3146, 4045
Caribbean 4086
Cartography 2016, 2036, 3010, 3062, 3064, 3117, 3162, 4018, 4031, 4048, 4061, 5086, 5103
China 3124, 3160, 3176, 4102, 5056, 5087, 5106
Climate 2042, 3017, 3023, 3050, 3103, 3138, 3159, 4013, 4067, 4092, 4099, 4122, 5005, 5020, 5031, 5038, 5054, 5095
Coastal and Marine 3089, 3119, 4022, 4073
Crime 3173
Crisis Zones 4059, 4091, 4121
Cultural 3019, 3086, 3163, 4112, 5126
Cultural Ecology 3080
Diffusionism 3018
Disabled 5030
Eastern Europe 5070, 5104
Economic 3068, 3143, 4094, 5073, 5091
Education 2050, 3074, 3078, 3093, 3099, 4016, 4047, 4083, 4112, 5027, 5119, 5125
Energy 5006, 5090
Environmental Perception 4055
Environment 2037, 3071, 3110, 3134, 4059, 4091, 4121, 5024, 5039, 5083, 5090, 5118
Ethnicity 4044, 5075
Europe 3077, 4117
European Community 2023, 4093, 5078
Feminism 2065, 3175, 4054
Field Experience 3140

AAUP Combined Book Display

●*UNIVERSITY OF TORONTO PRESS*

*Planned to Death
The Annihilation of a Place Called Howdendyke

A geographer explains how business demand, political, and planners' 'flexibility' destroyed a centuries-old English town.

Author: *J. Douglas Porteous* **Cloth:** *$45.00*

*Landscapes of the Mind

Porteous explains the importance of the non-visual senses in interpreting landscapes. He illustrates how we internalize these interpretations within our mental landscape and considers their meaning.

Author: *J. Douglas Porteous* **Cloth:** *$40.00*

*Creating a Landscape
A Geography of Ukrainians in Canada

Using a series of maps to depict the Ukrainian experience in Canada, the authors explore settlement patterns, organizational history, and a range of cultural traits: religion, language, mother tongue, and political orientation. A short essay accompanies each map, explaining significant trends and historical background.

Authors: *Lubomyr Y. Luciuk and Bohdan S. Kordan*
Cartography: *Geoffrey J. Matthews*
Cloth: *$37.50*

*The Structure of Urban Systems

Marshall defines urban systems analysis as a study of the spatial organization of networks of urban centres at regional, national, and international scales.

Author: *John Marshall*
Cloth: *$50.00* **Paper:** *$25.00*

*Historical Atlas of Canada
III: The Twentieth Century

Following the highly acclaimed first and second volumes, the third volume charts the development of Canada from 1900 to 1960, in 66 full-colour double-page plates.

Edited by: *Donald Kerr and Deryck Holdsworth*
Cartography/Design: *Geoffrey J. Matthews*
Cloth: *$115.00*

●*UNIVERSITY OF TEXAS PRESS*

*Man on Earth

Rejecting the common impulse to dismiss strange cultures simply because they are different, John Reader demonstrates that human adaptability is perhaps our most valuable asset. In making clear the extent to which cultural diversity has been fundamental to human success, this Book-of-the-Month-Club main selection affirms its value to our future.

Author: *John Reader* **Cloth:** *$29.95*

●*UNIVERSITY OF NOTRE DAME PRESS*

*The Climatic Atlas of Michigan

Includes over 400 individual maps and graphs, 100 in full color.

Authors: *Val L. Eichenlaub, Fred V. Nurnberger, Jay Herman, and Hans J. Stolle* **Cloth:** *$49.95*

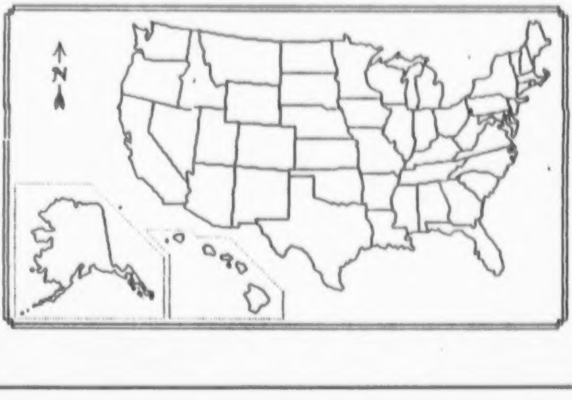
●*PENN STATE UNIVERSITY PRESS*

*A Taste of the Country:
A Collection of Calvin Beale's Writings

Diversity and commonality in the lives of rural Americans are the twin themes of these richly detailed essays by the chief demographer of the U.S. Department of Agriculture, who gained renown for documenting the reversal of the trend toward urbanization.

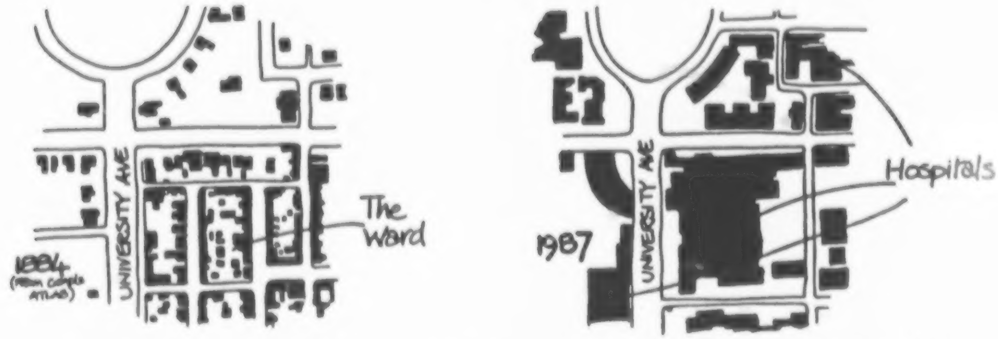
Edited by: *Peter A. Morrison* **Cloth:** *$28.50*

For these and many other exciting books, drop by the AAUP Booth—we'll be looking for you.



Fractals 3098
Free Trade 2011, 3053, 5078
Gaia 4065, 4098, 4126
Gender 3141, 4080, 4119, 4123, 5040, 5089
Geographic Thought 2038, 3057, 3091, 4081, 5099, 5100, 5129
Geomorphology 3016, 3029, 3070, 3073, 3092, 3105, 3122, 3158,
  4043, 4072, 4108, 4111, 4127, 5004, 5084, 5093, 5120, 5124
GIS 3004, 3012, 3045, 3065, 3100, 3127, 4007, 4015, 4018, 4027,
  4048, 4049, 4084, 4124, 4128, 5026, 5063, 5130
Global Village 4041, 4059, 4062, 4063, 4068, 4091, 4100, 4121, 5041
Global Warming 3150, 4009, 4058, 4090
Great Lakes 3044
Hazards 3059, 3094, 3143, 4026, 5041, 5077, 5082
Historical 2032, 3008, 3066, 3079, 3153, 3165, 4021, 4046, 4112, 4125, 5019, 5029, 5053, 5081, 5110, 5117
Homelessness 3027
Housing 5116
Human Geography 5013, 5048
Human Rights 5101, 5112
Hydrology 3096, 3125, 3164, 4053
Industrial 2011, 2023, 3013, 3118, 3152, 4011, 4123, 5025, 5061
Informal Sector 4005
International Finance 3042, 3101, 4069
International Trade 4113
Land Use 3143
Landscape 2039, 3072, 4023, 4075, 5126
Latin America 2035, 2049, 3133, 4012, 4069, 5014, 5049, 5102, 5113
Medical 3020, 3055, 3136, 4109, 5034
Mexican Border 3052, 3087
Microcomputers 5016, 5051
Migration 3047, 3097, 3126, 4024, 4029, 4082, 4130, 5097, 5105
Minorities 3144, 4028, 5012
Modelling 2041, 2047, 3073, 3114, 4030
Native Americans 3022, 3054, 3080, 4133, 5062
Natural Resources 2030, 2031, 3053, 3147, 5102, 5121
Nature 5018
Neighborhoods 4106
North America 2067, 3008, 3020, 3043, 3046, 3047, 3048, 3050, 3051, 3056, 3057,
  3059, 3061, 3080, 3090, 3091, 3096, 3111, 3112, 3120, 3156, 4020, 4070, 4080, 4120
Perestroyka 3058, 3123, 4006
Physical 3039, 4042
Planning 3137, 3143, 3155, 5043, 5127
Political 2063, 3015, 3085, 3128, 3139, 3145, 3149, 3174, 4101, 4117, 5017, 5033, 5052, 5074
Population 3061, 4014, 4074, 4112, 4129, 5064, 5122
Posters 3039, 3143, 4042, 4112
Postmodernism 3175, 4050
Public Finance 5045
Quantitative Methods 2033, 3113, 3161, 5057, 5111
Racism 3041
Recreation 3143, 5080, 5109
Regional 2028, 4068
Regional Development 3014, 3063, 3102, 3155, 4051, 4052, 4085, 4116, 5021, 5055, 5085, 5108, 5128
Religion 3072, 3106, 5114
Remote Sensing 3012, 3104, 3151, 4027, 4064, 4096, 4107, 5011
Rural 3066
Rural Development 3081, 5008
Rural Land Use 4087, 4118
Sediment 3154

Social 3083, 3131
Social Theory 4044, 4097
Socioeconomic 2040, 2051, 3081, 4008, 4057, 4089, 4119
Soil 3025, 5009, 5046
South Asia 5044, 5079
Southeast Asia 2026, 2064, 3069, 4095, 5007
Soviet Union 3024, 4066, 4110, 4115
Spatial Analysis 3076
Sport 3088, 5023
Sustainable Development 4060
Third World 2029, 3130, 3136, 4019, 4105, 4132, 5089
Time Geography 5068
Toponymy 5096
Travel and Tourism 3043, 3146, 4056, 4143, 5042
Transportation 3046, 3132, 5032, 5069, 5092
Urban 2037, 3006, 3011, 3048, 3051, 3082, 3131, 3143, 3148, 5022, 5060, 5067, 5072, 5081, 5088, 5110
Urbanization 2029, 4024, 4088
Waste Management 5015, 5050
Water Law 4010
Water Resources 4079, 4120, 5058
Wilderness 3026
Women 4006



A CENTURY OF CHANGES IN URBAN TEXTURE. UNIVERSITY AT COLLEGE

A Master of Innovation

TERRASOFT

THE COMPLETE GIS SOLUTION

NATURAL & LOGICAL

UNIQUE PC BASED GEOGRAPHIC INFORMATION SYSTEM
from a single work station to multi-user network

UNIQUE MODULAR APPROACH
enables growth

UNIQUE RASTER AND VECTOR BASED CAPABILITIES
powerful and flexible

UNIQUE USER INTERFACE
easy to learn . . . easy to produce decision making reports

For information contact:

DIGITAL RESOURCE SYSTEMS LIMITED

Head Office:
402 - 495 Dunsmuir Street
Nanaimo, British Columbia
V9R 2V2 CANADA

TEL: (604) 753 - 7122
FAX: (604) 753 - 1700

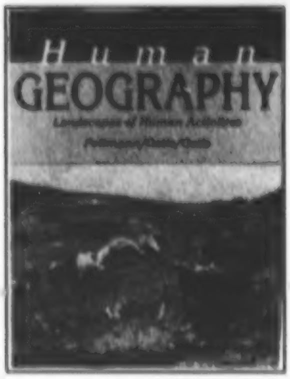
Branch Office:
202 - 470 Weber St North
Waterloo, Ontario
N2L 6J2 CANADA

TEL: (519) 725 - 2460
FAX: (519) 725 - 2626

WE COMMIT OURSELVES TO TRAINING AND SUPPORT

WCB
Wm. C. Brown Publishers

Your partner in teaching the world.



Human Geography: Landscapes of Human Activities,
Second Edition

by **Jerome D. Fellmann** and **Arthur Getis**, *both of the University of Illinois;* and **Judith Getis**

1990 / 482 pages / cloth / ISBN 5330

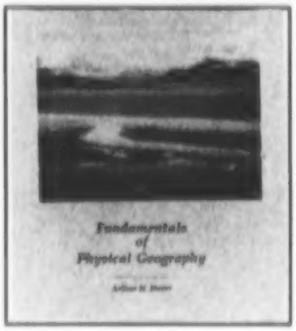
Fellmann, Getis, and Getis provide you with an unmatched illustration program, an excellent introductory chapter, a broadened international scope, a thorough pedagogical program, and a spatial interaction theme that unifies the text, all in coalition to show your students the impact of geography within their own lives! Check out this outstanding text – it's bound for global success!

Fundamentals of Physical Geography

by **Arthur H. Doerr**, with cartographic assistance from **Jerome F. Coling**, *both of the University of West Florida*

1990 / 400 pages / paper / ISBN 7905

Finally! The first true fundamentals text that offers you and your students everything you've been looking for! Doerr gives you a convenient, shorter format; complete, balanced coverage; and full-color illustrations – all at a price that's $5.00 to $10.00 less than the competition. Give your students a firm foundation - take a look at Doerr today!



Cartography: Thematic Map Design, Second Edition

by **Borden D. Dent**, *Georgia State University*

1990 / 415 pages / paper / ISBN 7991

This current introductory cartography text offers you many new and expanded features, such as: emphasis on the student's role as a map designer; an updated discussion of Census geography; an expanded examination of geographical concepts; a new discussion on modern laser printing; new treatment on choropleth map-classing techniques; over 240 detailed illustrations; and more! Let Dent help you make learning easier for your students!

**Stop by booth #208, or call toll-free: 1-800-331-2111
and meet your partners in teaching today!**

Wm. C. Brown Publishers • 2460 Kerper Boulevard • Dubuque, Iowa 52001

PARTICIPANTS INDEX

Aangeenbrug, Robert T. 4084
Abler, Ronald F. 3049, 4049
Abrahams, Athol D. 3073, 4043
Adams, John S. 3049
Adams, Peter 2018, 3084
Adelman, Howard 3061
Agnew, John 4044, 4046
Aguado, Edward 3039, 5031
Ahern, Rowena 3137
Ahlrichs, Gretchen 3026
Ahmed, Rafique 5038
Ahuja, Dilip 4090
Airriess, Christopher A. 5007
Aitken, Stuart C. 4055, 5068
Akerman, James R. 3010
Alanen, Arnold R. 2032
Alexander, Richard 3125
Alexander, Robert H. 5130
Ali, Mohammed A. 3130
Allen, Daniel S. 4125
Allen, James R. 3119, 3154
Allen, John 5094
Allerton, Simon 5004
Alonso, Santiago 5041
Alsop, Ted J. 5095
Ambrosia, Vincent G. 3151
Amedeo, Douglas M. 5030
Amery, Hussein A. 2063
Amey, Robert G. 3010
Ammah-Tagoe, Felix Ayikwei 3009
Amrhein, Carl 3127, 3161, 4030
Amundson, Bruce A. 4109
Anderson, David L. 3019
Anderson, Eric A. 3145
Anderson, Malcolm 4143
Anderson, Patricia 5005
Anderson, Richard T. 4016
Anderson, Thomas D. 3128, 4100
Anderson, Timothy G. 5029
Anderson, Valerie 5105
Andersson, Lennart 4052
Andrews, Alice 4016, 5126
Andrews, Sona Karentz 2002, 5030
Angel, David 3005
Annenkov, Vladimir V. 4059
Anselin, Luc 3128, 5111
Antwi-Nsiah, Cherub 5089
Arbogast, Alan F. 3039
Archer, J. Clark 3145, 5045
Arlinghaus, Andrea V. 4112
Arlinghaus, Sandra L. 2033, 2041, 3098, 4042
Arlinghaus, William C. 2033, 4042
Arlinghaus, William Edward 4112
Armstrong, D. 3119
Armstrong, Marc P. 2016, 2033
Arnfield, A. John 5020, 5054
Aronsson, Lars 4052
Artz, Joe Alan 3070
Ashmore, Peter 5124
Askew, Paul 2047
Aspaas, Helen Ruth 5089
Aspbury, George 3028
Astroth Jr., Joseph H. 4018
Austin, C. Murray 1008, 2060, 5091
Awasthi, Anita 4073
Ayers, M. A. 3125
Bach, Wilfred 4041, 4058
Baerwald, Thomas J. 3049, 3095, 3172, 4015
Bailey, Adrian J. 5057
Bailey, Timothy J. 3011
Bailey, W.G. 3103
Bain, Gregory K. 4005
Bain, Nancy R. 5094
Baker, Alan M. 3100
Baker, Bryan D. 3129
Baker, Simon 4112
Baker, William L. 2027
Balachandran, C. S. 2041
Balek, Cindy 4127
Ball, Colin J. 4047
Ball, George 3127
Balling Jr., Robert C. 3096
Band, Lawrence E. 3045, 4018, 4043, 5130
Banda, Greata 5122
Banerji, Raja 4069
Banfield, Jeff 3135
Banks, Steven M. 3155, 5021, 5108
Baranov, Elena A. 3024
Barbash, Natasha 4006
Barbour, Jon M. 3012
Barff, Richard 4011
Barker, Howard W. 5095
Barlow, Connie 4065
Barlow, I. Max 1008
Barnes, C. Taylor 5097
Barnes, Kim D. 5073
Barnhardt, Michael L. 3039
Barr, Brenton M. 3123, 4115
Barrett, Frank 4112
Barrett, Linda 4111
Barrick, Kenneth A. 3135
Bartlein, Patrick J. 3007, 5005
Barton, Anthony 4126
Bascom, Johnathan 4100, 5059
Basem, Lawrence 3097
Basist, Alan 3138
Bass, Brad 4020
Bassett, Thomas J. 3009
Basu, Ramala 1006
Bathgate, Jon 3143
Batty, Michael 3098
Bauer, Bernard O. 3089, 3119, 3154, 5084
Bayer, Karel 4081
Beach, James H. 4015
Beach, Timothy P. 5009, 5046
Beale, Calvin L. 4129
Bear, Margaret 4075
Beard, M. Kate 2036
Beatty, Susan W. 3060, 3129, 3167
Beauregard, Robert A. 4088
Bebbington, Anthony 5010, 5047
Becker, Barbara 3014
Beckham, W. S. 4042
Bednarz, Robert S. 2050, 5118
Bednarz, Sarah W. 2050
Beesley, Kenneth B. 3143
Beitzel, Barry J. 4081, 4114, 4146
Belanger, Alain 3047
Belec, John 3048
Bell, Michael M. 5129
Bell, Thomas L. 2041
Bell II, Ed 4111
Bencloski, Joseph W. 4042
Benhart, John E. 2022, 2046, 4051
Bennett, David 3073
Berardi, Gigi 5008
Berdoulay, Vincent 2028, 3056, 3090, 3120, 3156
Berentsen, William H. 2061, 5025, 5104
Bergeron, Normand 3073
Berman-Santana, Deborah 4028
Bernstein, Mark 4090
Berry, Brian J. L. 4063
Berta, Susan M. 3039
Beyers, William B. 3118
Bhardwaj, Surinder M. 5023, 5114
Bhatia, Shyam S. 4112
Bian, Ling 3098
Bieneman, Paul M. 3039
Bigelow, Bruce 3019
Biggs, James E. 4024
Binder, Elisabeth J. 5040
Bingham, Ralph 3039
Birkeland, Karl W. 4108
Bishton, Amy 1006
Black, William R. 3132, 4033, 5069
Bladh, Gabriel 4116
Blank, Paul W. 5075
Blaut, J. M. 3018, 3041, 4057
Blewett, William L. 3029
Bliss, Elaine 5089
Blomley, Nicholas K. 3085
Blum, Michael D. 3070
Boardman, John 5093
Boas, Charles W. 3046
Boddy, Martin 4051
Bodman, Andrew R. 5117
Boehm, Richard 4016, 4083
Bohland, J. 4109
Bokuniewicz, Henry 5026
Bolling, Keith D. 5060
Bond, Andrew R. 4110, 4115
Bondi, Liz 3006, 4050, 4097
Bone, Robert M. 4133
Bosowski, Elaine F. 3093, 5119
Boswell, Thomas D. 4024, 4086
Boszhardt, Robert 5004
Botts, Howard 3143
Bourassa, Steven C. 2031, 5127
Bourne, Larry S. 3051, 4045, 5116
Bowden, Martyn J. 3090, 4055
Bowen, Marshall 3079
Bowen, William A. 1002, 5034
Bowen Jr., John T. 3143, 4112
Bowlby, Sophie 4071
Bradbury, Susan L. 3102
Braden, Kathleen 4041, 4068, 4100
Bradford, Michael 5119
Bradshaw, Michael J. 3058, 3123, 4068
Brass, James A. 3151

NUMBERS REFER TO SESSION NUMBER

PARTICIPANTS

Brauer, Ralph 3010
Brazel, Anthony J. 2052, 3050, 4092
Breitbart, Myrna M. 4119
Brennan, David P. 4071
Brewer, Cynthia A. 3062, 3117
Brey, James A. 4020
Brigham, Warren U. 4015
Bright, P. Blaise 2042
Brinegar, Richard L. 4013
Brinkman, Robert 5028
Bristow, Robert S. 2030
Britton, Charles R. 2040
Britton, Edward C. 5028
Broadway, Michael J. 4045, 4082
Brohman, John 2035, 3085
Bromley, Ray 3137, 5017
Brooker-Gross, Susan 5117
Brookfield, Harold 4121
Brooks, Susan 4108
Broome, Frederick R. 1006
Brown, B. T. 3158
Brown, Brock J. 3153
Brown, Christopher 5118
Brown, Daniel G. 5011
Brown, Jonathan 3044
Brown, Kathleen Molnar 3145
Brown, Lawrence A. 3133
Brown, Marilyn A. 4090, 5006, 5090
Brown, Marilyn 4047
Brown, Robert L. 4108
Brown, Robert N. 5043
Brown, Tommy 3044
Brown, William R. 5114
Browning, Jeremy D. 2051
Brunn, Stanley D. 3015
Bryan, Rorke B. 2001, 4043, 5084, 5093
Bryant, Christopher R. 4070, 4087, 5073
Buchanan, Elizabeth 4029
Buckler, William R. 3039
Buckley, Patrick 3141
Buckwalter, Donald W. 3063
Bullamore, Henry W. 3143
Bulman, Teresa L. 4010
Bunch, Charlotte 4054
Bunker, Stephen G. 4057
Bureau, Luc 3090
Burgess, Rod 4062
Burkard, Marylou 3142
Burnett, Adam W. 4013
Burr, Kevin F. 3026
Burr, Ted N. 3039
Burt, Kirsty 3045
Bushong, Allen D. 3091, 4112
Bussing, Charles E. 4042
Butler, David R. 3029, 4025, 4108, 5011, 5084
Butler, Richard W. 2058, 3146, 4056, 5042, 5118
Buttenfield, Barbara P. 2016, 2036
Buttimer, Anne 3056, 3090, 3120, 3156
Butts, Kent H. 3075
Butz, David 3130
Butzer, Karl W. 3056
Bylund, Erik 4085
Caldwell, John M. 3153
Calzonetti, Frank J. 3053
Campbell, David J. 5010, 5047
Campbell, Gerard M. 4042
Campbell, Jon 5096
Cao, Changyong 3117
Cao, Meisheng 2042
Capelle Jr., Russell B. 5069, 5078
Carbone, Gregory J. 3039
Caris, Paul David 3048
Carleton, Andrew M. 4067
Carlin, Scott 3071
Carnahan, Walter H. 3143
Carney, Judith 5010, 5047
Carstensen, Laurence W. 5065, 5103
Carter, Simon E. 5010, 5047, 5115
Cartier, Carolyn L. 5087
Cary, Tina 1005, 2003
Casetti, Emilio 3013, 5021, 5085
Catton, Bette 4109
Caviedes, Cesar N. 4053, 5031, 5049, 5077
Cerabregu, Muharem 3010
Cerveny, Randall S. 4058
Chalidze, Francheska N. 5024
Chambers, Fred B. 3159
Champion, A.G. 4014
Chan, Ka-yan 4102
Chan, Kam Wing 3124
Chandra, Bidhan 4113
Chang, Jane 4085
Chang, Robert 3044
Chase, Jacquelyn 2035
Chatterjee, Lata 3141
Che, Yuhu 2041
Cheek, William H. 5080
Cheng, Ze-ming 2041
Chestang, Ennis 4022
Chifos, Carla 3048
Child, Jois 3117
Chin, Anne 3016
Chiotti, Quentin P. 3116
Chirayath, Verghese J. 4106
Chou, Hsueh-cheng 3100
Chou, Yue-Hong 5111
Chouinard, Vera 3085, 5013
Chrisman, Nicholas R. 3045
Christopherson, Susan 4123
Church, Andrew 3006
Church, Gardner 3051
Church, Richard L. 2041, 5092
Clark, David 5091
Clark, James D. 3127
Clark, Walter F. 4022
Clark, William A.V. 3021, 4074
Clarke, Anthony Orr 3125
Clarke, Audrey E. 3152, 5086
Clarke, Graham 2047
Clarke, Keith 2041, 5026
Clarke, Susan E. 5088
Clarkson, Lorraine 3040, 3107, 4078
Clawson, David R. 5049
Clay, Bradley J. 3137
Clayton, Daniel 5029
Clements, John P. 2028
Cleveland, Cutler J. 3005
Clifford, Nicholas John 3016
Cloke, Paul 3081, 3139
Cloke, V. 3081
Cobb, Sharon Corkill 3143
Cobban, James L. 5007
Code, William R. 3057
Coffman, John E. 5034
Cogbill, Charles V. 2027
Cohan, Dan 5011
Cohen, Saul B. 5, 1001, 3038, 4144, 4147
Cohen, Stewart J. 3050, 4058, 5038
Colakovic, Branko 4029, 5104
Colby, Jeffrey D. 3012, 4042
Cole, Daniel G. 3010, 5062, 5096
Cole, David B. 5088
Coleman, D.E. 3094
Colten, Craig 2032
Comeaux, Malcolm L. 3019
Comrie, Andrew C. 4067
Conaty, Daniel G. 5058
Conkey, Laura E. 2027, 3074
Connolly, Kathleen M. 3129
Conway, Dennis 4086
Cooke, Donald F. 1006
Cooke, Philip 3174
Cooke, Thomas J. 4008
Cooksley, Kate 3043
Coomes, Oliver 5102
Corbett, John 5077
Corbridge, Stuart 3042, 3174
Cordova Aguilar, Hildegardo 4012
Corkran, Michael W. 3039
Cornell, Stephen 3080
Costa, Frank J. 3155, 5116
Couclelis, Helen 3161, 4007, 4048
Coulson, Michael R.C. 3065
Cowen, David 3078, 4049
Cowper, Diane C. 4130
Cox, Ron 4005
Craig, Clifford B. 4016, 5114
Craig, Jane L. 3143
Craig, Mary R. 3135
Craig, William J. 4084
Crampton, Jeremy 5086
Crane, Robert 2042, 4107
Crang, P.A. 3149
Craumer, Peter R. 4115
Crew, Bruce R. 4081
Crilley, Darrel 3006
Cromley, Ellen K. 4066, 4103, 4109, 4115
Cromley, Robert G. 4042
Cross, John A. 5059
Crowhurst, Andrew 3019
Crump, Jeffrey R. 5045
Crumplin, William 5074
Crush, Jonathan S. 5105
Cuba, Lee J. 4130
Curran, Claude W. 5126
Currey, Donald R. 3039
Curry, Leslie 4030
Curry, M. Patrick 2030
Curry, Michael 2065, 5053
Curry-Roper, Janel M. 4087, 4118

INDEX

Cutter, Susan 5041, 5082
Cybriwsky, Roman 5060, 5116
D'Costa, Jashinta 2029
Dagel, Kenneth C. 3054
Dahmann, Donald C. 5064
Dahms, Dennis E. 3025
Dalby, Simon 3128
Dando, Lara M. 4042
Dando, William A. 4115
Dangermond, Jack 3078, 5103
Daniels, Richard C. 4042
Darlington, James W. 3008
Davenport, David P. 3008
Davidson, Fiona M. 3101
Davidson-Arnott, Robin 3119, 5084
Davies, John A. 5095
Davies, Suzanne 3021
Davis, Anthony M. 2009, 3070, 4017
Davis, B. 3151
Davis, Clint E. 3163
Davis, James A. 5061
Davis, James L. 3143
Davis, Robert E. 4013, 4067
Davis Jr., DeWitt 2017, 4028, 5012, 5060
Dawsey, Cyrus B. 4027
Dawson, D. K. 3050
Dawson, Teresa 5117
Day, Frederick A. 4130
Day, J.C. 3094
Day, Michael 5120
De Boer, Dirk H. 3073
De Bres, Karen 5032
De Haan, Leo 4019
De Jong, E. 5093
De Laubenfels, David J. 4015
De Smidt, Marc 2023
De Souza, Anthony R. 3077, 4057
De Vet, Jan Maarten 3082
DeAre, Diana 4014
DeCola, Lee 2033, 3127
DeHart, Jennifer L. 3143
DeMers, Michael N. 3012, 3065
DeNoyelles, J. 4064
DeSmidt, Marc 4093
DeVivo, Michael 2050, 5112
DeWitt, John 4105
Dear, Michael 3027, 4050, 5053
Dearden, Philip 3026, 4022, 4056
Deardorff, G. W. 4042
Debbage, Keith 5042
Delaney, Edward J. 3013
Delehanty, James 5010, 5047, 5077
Demko, George J. 3123, 4101, 5070
Denevan, William M. 4012
Dennis, Richard 5081
Densham, Paul 3114
Dent, Borden D. 3064
DesLauriers, Pierre 4087
Deskins Jr., Donald R. 2040
Desloges, Joe 2009, 3016, 5124
Deutsche, Rosalyn 3175
Devine, Neal 3089, 5125
Dewey, Kenneth F. 4099
Dezzani, Raymond J. 5111
Dhussa, Ramesh C. 3019
DiBiase, David 1002
DiCenzo, Peter D. 5009
DiRezze, Paul G. 3142
Dickason, David 3034, 4068
Dicken, Peter 2023
Dickinson, G. 4056
Dietz, John 3163
Difrancesco, Rick 3150
Diggs, David M. 3134
Dilley, Maxx 4042
Dilley, Robert S. 5023, 5109
Dillon, Leo I. 4042
Dillworth, Mary E. 4064
Dingemans, Dennis 5032
Dixon, Catherine E. 5064
Dixon, Clifton 5077
Dixon, John C. 4127
Dlin, Norman 4005
Dobson, Jerome E. 3045, 4015, 4049, 4084, 5130
Dodge, Sheridan L. 3135
Dodson, Russell L. 5027
Domingo, Vernon 2035, 4019
Domosh, Mona 2065, 3086, 5019, 5053
Donaghu, Michael 4011
Donell, Robert 3043
Dong-hee, Koh 5041
Donnell, Robert 4051
Doolittle, William E. 3120, 4068
Dorn, Ronald I. 4127
Dorney, Jane 5126
Dort Jr., Wakefield 3025, 4072
Doubleday, Nancy C. 3120
Douglas, David H. 3065
Dow, Kirstin M. 4059
Dow, Maynard Weston 3121, 3157
Downing, Thomas E. 4009, 5028
Drache, Daniel 2011
Drake, Christine 3130, 4019
Dramowicz, Konrad 3100
Drdos, Jan 5070
Drennon, Christine M. 3009
Driever, Steven L. 3014, 4105
Driver, Felix F.S. 5019
DuBois, Jean-Marie M. 4042
Duckson Jr., Don W. 3039
Dudley, Graham 5063
Duerden, Frank 5062
Duffus, David A. 4022
Duguay, Claude 5095
Dulaney, Wayne P. 3104
Dunayevich, Bernard A. 5113
Dunn, James M. 5027
Dunning, Nicholas P. 5009, 5046
Dunning, Richard D. 3115
Dupont, Louis 3056
Dutt, Ashok K. 3155, 4093, 5044
Dvoichenko-Markov, Demetrius 5104
Dworkin, Judith M. 4010
Dye, Dennis 3104
Dye, Robert H. 4064
Dykeman, Floyd W. 3066
Earickson, Robert 3020, 3055, 4032, 5074
Earle, Carville 3176, 4046, 4121, 5098
Easterling, David R. 4013
Easterling, William E. 4009
Eberhardt, Anthony J. 3044
Echavarria, Fernando 5121
Eck, Thomas 3104
Eddy, Frank 3105
Edgington, David W. 5108
Edmonds, Alan K. 3065
Edwards, James 4015
Edwards, Kevin J. 3007
Edwards, Susan 3043
Eflin, James 2040, 5017
Ehemann, Jane 2031
Eichhorst, Jean M. 5097
Elbert, Julie 5119
Elberty Jr., William T. 3140
Elbow, Gary S. 2049, 5014, 5049, 5101
Eldridge, J. Douglas 3013
Ellenwood, David S. 3143
Elliott, Susan J. 5118
Elliott-Fisk, Deborah L. 4070
Ellis, Mark 5057
Elmes, Gregory A. 5026
Elshaw-Thrall, Susan M. 3099
Emel, Jacque 3071, 3139, 3147, 5083
Emison, Grant 5025
England, Kim V. L. 3005
Engstrom, Wayne N. 3105
Enscore, Susan 2032
Erickson, Christopher A. 3087
Erickson, Frank A. 3133, 4070
Erickson, Rodney A. 4113
Ernste, H. 3152
Ernste, Huib 2023
Esparza, Adrian 3118, 3152
Espy, Amanda 4018
Estaville Jr., Lawrence E. 3153
Ettlinger, Nancy 4094, 5076
Evans, Brian M. 4029
Everitt, John C. 4082
Evrensel-Brown, Ayse 3015
Ewing, Gordon 3011
Exline, Christopher H. 3137
Eyles, John 3020, 3055, 5118
Faiers, Gregory E. 3103
Falah, Ghazi 5033
Falconer, Karen Frances 2037
Falk, Paulette 4111
Fan, C. Cindy 3005, 5021, 5055, 5085
Fan, Ming 3155
Farmer, Charles J. 5096
Farrell, Pat M. 4104
Faust, David 5091
Fearn, Miriam Lee 4017
Feddema, Johannes 4053
Fedor, Thomas S. 5094
Feit, Harvey A. 3022
Feitelson, Eran 3134
Feng, Jane Zhen 3110
Ferguson, Bruce K. 5020
Fernandez, Raul A. 3052
Ferrett, Robert 3088
Ferrill, Martha Jean 3163, 5028

PARTICIPANTS

Fieser, John B. 4008
Fik, Timothy J. 3014, 5068
Fincher, Ruth 3174
Fischer, Linda K. 3106
Fisher, Peter F. 4042, 5016, 5051
Fisher-Allison, Nancy 4006, 4100
Fitch, Mark J. 4067
FitzSimmons, Margaret 2045, 2065, 3071, 3083, 4057, 4097, 5107
Fitzgerald, Michael Timothy 3151
Fitzsimons, Dennis 1002
Flad, Harvey K. 5039
Flad, Mary M. 5039
Flaherty, Mark 5074
Flay, Gregory M. 3132
Fleming, Jeff 3039
Florida, Richard 4011
Flury, Andreas 5030
Folch-Serra, Mireya 3086
Fonkert, J.H. 3025
Fonseca, James W. 5100
Fontanella, Joseph F. 3162
Fontanella, Sharon K. 3024
Foord, Jo 4071
Ford, Derek 5120
Ford, Jack 5063
Ford, Larry R. 3086
Ford, Richard 2040
Ford, Robert E. 2032, 5008, 5096
Forstall, Richard L. 4129
Foster, Stuart A. 5055, 5085
Fotheringham, A. Stewart 2047, 3076, 3113, 3161, 4140
Foust, Brady 3143
Francek, Mark 4072
Frank, Andrew U. 3004
Frank, John 5118
Franklin, Janet 4096
Frazier, John W. 5015, 5050, 5073
Frederic, Paul 3066, 3116, 3147, 4036, 5008
Frederick, Charles David 5077
Fredlund, Glen 4017
Fredrich, Barbara 4042
Freedom, Gary S. 4112
Freeman, Luisa M. 5026
Freidel, Dorothy E. 5124
Freidhoff, Brian P. 2030
Frenkel, Robert E. 3060
Freundschuh, Scott M. 4048, 4128
Frey, William H. 4129
Friberg, Justin C. 4071
Fridell, Deborah 4042
Fried, Susana 3149
Friedmeyer, J. Lynne 2033
Friel, Christopher A. 4103
Frye, Daniel E. 5086
Fryman, James F. 5097
Fuguitt, Glenn V. 4129
Fuller, Gary 5122
Fung, Tung 4107
Furedy, Christine 5015
Furuseth, Owen J. 3081, 3147
Gad, Gunter 2012, 2024
Gade, Daniel W. 4012
Gade, Ole 4052, 4085, 4116, 5008
Gadwood, Michael T. 3088
Gaile, Gary L. 3076, 5088
Gale, Robert J. P. 1007, 2037, 3053
Galloway, Gerald E. 3112, 4079
Gardner, James S. 4043
Gares, Paul A. 3089, 3119, 3154
Gaston, Greg G. 3012
Gatch, Lucinda 5051
Gauthier, Howard L. 5014
Gentile, Jack 3026, 3134
Gerlach, Jerry 3153
Gerlach, Russel L. 2063
Gersmehl, Philip J. 2002, 5009
Gertler, Meric S. 2011, 3068
Gesler, Wilbert M. 3055, 3136, 3144
Getis, Arthur 2047, 5111
Ghosheh, Baher A. 3009, 4105
Giardino, John R. 4042
Gibbs, David 3102
Gibson, Lay James 2056, 3087
Gilbert, Anne 3120
Gilbert, Melissa 3149
Gilbert, Richard 3051
Gilg, Andrew W. 4087
Gill, Alison 3043, 5042
Gilmartin, Pat 3078, 4061
Gimblett, Randy 3127
Giorgi, Filippo 4098
Glawson, Gailya T. 3142
Gleason, Allan 1009, 3106
Gober, Patricia 3021, 5122
Godfrey, Brian J. 2029
Goering, Peter 4060
Goetz, Andrew R. 3046
Gohstand, Robert 4066, 4110, 4115
Golant, Stephen M. 3021, 4103
Gold, Gerald 5071
Golding, Dominic 4059, 4091
Golding, Sue 5083
Goldman, Abe 5010, 5047
Goldsmith, Victor 2041, 5026
Golledge, Reginald 3076
Golledge, Reginald G. 5030
Gomez, Basil 5004
Gong, P. 4107
Gonzalez, Alfonso 2035, 3015
Goodchild, Michael F. 2034, 2054, 3114, 3161, 4007, 4124, 5068
Goodfellow, Gib 4047
Goodin, D. 4064
Gopal, Sucharita 4048
Gordon, Roni 3143
Gordon, Steven I. 5026, 5058
Goss, Jon D. 3069
Gossette, Frank 1002, 3065, 5051
Goudge, Theodore 3088
Gould, Michael D. 4048
Goulette, Ann 1006
Goward, Samuel N. 3104, 4041, 4098
Gradus, Yehuda 2040
Graf, William L. 3092
Graff, Thomas O. 4130
Graham, Julie 3083, 4123, 5048
Grant, Richard 3128
Grass, Eric 2011
Gratton, Denis J. 3039
Graumlich, Lisa 3074, 3135, 4017, 5005
Gravel, Ginette 3098
Gray, Susan 4042
Green, Jerry E. 2037
Green, Milford B. 3152
Greenberg, Michael 3049, 3144
Greendeer-Lee, Joan 4133
Greene, Richard 4008
Greenland, David 5024
Greenwood, Brian 2001, 3154, 4073
Greenwood, John 3044
Greer-Wootten, Bryn 3134, 5118
Gregor, Howard F. 5107
Gregory, Derek 2038, 4050, 5013, 5048
Greiner, Alyson 5126
Griffin, Ernst 2029, 5014
Griffith, Daniel 3076, 3113
Griffiths, Andrew 4087
Grima, A. P. Lino 3053, 3112
Grimes, Thomas P. 2031
Grimmond, Sue 3138, 5020
Grissino-Mayer, Henri D. 3017
Gritzner, Janet 4027, 5062
Groop, Richard E. 4042
Gros, Sally L. 4042
Grossman, Lawrence S. 4091, 5115
Gruntfest, Eve 4026, 4079
Guay, Lorraine 4112
Guelke, L.T. 3091
Guido, Ronald 3044
Guidugli, Odeibler Santo 4024
Guinn, Becky 5092
Gullette, Brian R. 2063
Gulley, Harold E. 5096
Guptill, Stephen C. 3004, 4018
Gury, Jacques 5041
Gustafsson, Gerhard 4085, 4116
Gwilliam, Bruce L. 3159
Haack, Barry 4107
Hackel, Jeffrey D. 3028
Hackney, Stephen M. 2037
Hadley, Keith S. 2027, 3060
Hafen, Mark R. 5025
Hafner, James A. 2026
Haider, Wolfgang 4056
Haight, Murray 5118
Haila, Anne 4088
Haithcoat, Timothy L. 4018
Hall, Jerry A. 2030, 3143
Hall, John 3038
Hall, Peter 4093
Hallsworth, Alan G. 4071
Halseth, Greg 3021
Hamilton, Hugh 4043
Hamilton, Janet Drake 3039
Hammel, Daniel J. 5088
Hammer, R. David 4018
Hampson, Christine 3055
Hancock, R.G.V. 3070
Handley, Lawrence R. 4096

INDEX

Hannan, Mike 5085
Hansen, William 5026
Hansen-Bristow, Katherine J. 3135, 4042, 4108
Hanson, Brian 3103, 4072
Hanson, Susan 2010, 2015, 2059
Haque, Chowdhury E. 2064
Harary, Frank 2033
Harden, Carol 3122
Hardin, David S. 2032
Hardisty, J. 3154
Hardwick, Susan Wiley 3072, 3131
Hardwick, Walter G. 3084, 5033, 5100
Hare, F. Kenneth 3038, 4065
Harley, Brian 2002
Harlin, John M. 3023, 4018
Harman, Jay R. 4092
Harmon, John E. 5072
Harmon, Phil 3026
Harnapp, Vern 4020
Harper, David E. 5121
Harper, Robert A. 4083
Harries, Keith 3173
Harrington, James W. 2011, 3118, 4094
Harrington, Lisa M. B. 4118
Harrington Jr., John A. 3023, 5095
Harris, Jasper L. 3110, 5024
Harris, R. Cole 3056, 3111, 3156, 4080
Harris, Richard 5081, 5110
Harris, Trevor M. 5093
Harrison, Glen 5092
Hart, Deborah 4005
Hart, John Fraser 3081
Hart, L. Gary 4109
Hartman, Mark F. 4099
Hartmann, Rudi 3043, 4117, 5042
Hartnett, Sean 3099
Hartviksen, Ken 5109
Harvey, L. Edward 3129
Harvey, L.D. Danny 3150
Harvey, Milton E. 2033, 3136
Harvey, Thomas 5116
Hasnath, Syed Abu 2029
Haston, Laura 3138, 5031
Hausladen, Gary 3058, 3123
Haverluk, Terrence W. 3163
Hawkins, Michael 4125
Hawley, Dawn 5127
Hay, L. E. 3125
Hayes, B. 4064
Hayes, Michael V. 3020, 3055, 5034
Hayes, Jr., Robert D. 5016
Haynes, Kingsley E. 3049, 4084
Hayter, Roger 2011
Hayward, David J. 4113
Haywood, Michael 5042
Head, Clarence M. 4022
Hecock, Richard D. 4056
Heffernan, Michael 5019
Heffington, Douglas 3140
Hehr, John G. 2040
Heiman, Michael 3071, 5052, 5083
Heinzmann, J. 5070
Helfert, Michael 4042
Helgeland, Catherine H. 5090
Helleiner, Fred 1
Hemmasi, Mohammad 3106, 5097
Henderson, Martha L. 3080
Hennayake, Nalani 3130
Hennayake, Shantha K. 4044
Hennig, Leaura M. 5041
Henrichsen, Linda 5043
Henrie, Roger L. 5114
Henry, Norah F. 2051
Hepner, George F. 3004
Herman, Thomas E. 3142
Hernandez, Yezmin 5041
Herod, Andrew 5067
Herr, J. Paul 5074
Hess, Darrel 3082
Hessels, Martin 3063
Hewings, Geoffrey J. D. 3068, 3152
Hewitson, B. 2042
Heywood, N. C. 5058
Hibbard, K. 3151
Hickin, Edward J. 5124
Hickson, Tom 5077
Hiebert, Daniel 3067
Higgins, Bryan 3041, 4062
Higley, Stephen R. 3131
Hiley, Jim 5059
Hill, A. David 4083, 5027
Hilliard, Sam 3140
Hillsman, Edward L. 3150, 5006
Hinkel, Kenneth M. 3039
Hiraoka, Mario 5102
Hirschboeck, Katherine K. 3096, 3125, 4053
Hitchcock, John 3108
Hobbs, Elizabeth 4104
Hobgood, Jay S. 4092
Hodge, David C. 2040
Hodgson, Michael E. 3162, 5041
Hodler, Thomas W. 4042
Hoff, Judy L. 3125
Hoffman, George W. 3077, 5070
Hoffpauir, Michael E. 3162
Hohol, Fran 5088
Holcomb, H. Briavel 3048, 5088
Holder, G. H. 4107
Holdsworth, Deryck W. 3086, 3111, 4045
Holloway, Steven R. 4008, 5055
Holly, Brian P. 2051, 3152
Holmes, Dan 5063
Holmes, John 2011, 3102
Holmes, William M. 4020
Honerkamp, N. 3019
Honey, Rex 1008, 5045
Hooey, Catherine A. 5128
Hoogvliet, Adriaan 4106
Hooson, David J.M. 4066
Hope, Allen S. 4096
Hopkins, Daniel 3064
Hordon, Robert M. 3039
Hornbeck Jr., David 3057
Horner, Randi 2039
Horst, Oscar H. 5049, 5114
Horton, Carl A. 5004
Horvath, F.J. 3094
Hosier, Richard H. 4090
Hossain, Ziarat 2064
Hovinen, Gary 2028
Howard, Lance F. 5019
Howarth, David A. 3096, 3125, 4053, 4092
Howarth, Philip J. 3039, 4042, 4107
Howatt, Benjamin F. 5008
Howells, Jeremy 2023
Hramiak, Roman J. 5022
Hsu, Mei-Ling 4068
Hu, Huaying 3160
Hudman, Lloyd E. 5128
Hudson, John C. 3128, 4113
Huff, Anne S. 3013
Huff, James O. 3013, 3076
Hughes, Marilyn G. 3023
Hugill, Peter J. 4055
Huppert, George 3039
Hurst, Charles 5072
Husband, Eliza 4112, 5114
Husbands, Winston 3146
Hussey, Antonia 5007
Hutchings, Janice Haskett 4133
Hutchinson, Therese 4109
Hyman, William A. 3150
Hynes, Martin 4094
Ibanez, Juana L.C. 5059
Ilbery, Brian 4087
Illum, Steve 5080
Ilyin, Pavel 4110
Innes, Frank 3136, 4109
Irvine, Kim 3044
Irwin, T. E. 5005
Isard, Scott A. 3025
Isin, Engin F. 4021
Israilevich, Philip 2051
Isserman, Andrew 3126
Itami, Robert 3127
Iyegha, David A. 3009, 4132
Jaakson, Reiner 5080
Jackson, Charles L. 4130
Jackson, Philip L. 3012
Jackson, Randall W. 2051
Jackson, Richard H. 3079
Jackson, W.A. Douglas 4068
Jacobi, J.M. 3054
Jacobs, Peter M. 4111
Jacobsen, Judith 3022
Jagger, Kathleen Anne 3119
Jakubauskas, Mark E. 4064
James, Allan 3122
Jampoler, Susan 4107
Janelle, Donald G. 4001, 5001, 5068
Janiskee, Robert L. 5080, 5112
Janson, Richard W. 3052, 3087
Jenks, George F. 4061, 5103
Jennings, Steven A. 4017
Jensen, John R. 3151
Jenson, S. 3125
Jett, Stephen C. 2057, 3019, 3054
Jipp, Peter 5102
Jogoo, Vasantt 3089

PARTICIPANTS

Johansen, Harley 3081
Johns, Rebecca A. 3071
Johnson, Daniel M. 3039
Johnson, Donald L. 4127, 5084
Johnson, Eric S. 5038
Johnson, Kenneth 3063
Johnson, Mark O. 3009
Johnson, Nuala C. 4044
Johnson, Scott M. 5058
Johnson, William C. 3070, 3140, 5004
Johnston, Ronald J. 3174, 5076
Johnston, Tom 3116
Jonas, Andrew 3085
Jones, Donald W. 3068, 3118, 5006
Jones, Gary 3044
Jones, Jeff A. 4085
Jones, Ken G. 4071
Jones, Richard 3061, 3126, 5014
Jones III, John Paul 2038, 3013, 3131, 5055
Jong, Wil de 5102
Jordan, Terry G. 3080
Joshi, Tulasi R. 2029
Justham, Stephen A. 4016
Kagan, Mikaella 4066
Kaiser, Robert 3058
Kale, Vishwas 4073
Kalkstein, Laurence S. 4122
Kaplan, David H. 3047
Karan, P.P. 4069, 4120
Karing, Tiia 5080
Kariya, Paul 3090, 4133
Kasperson, J.X. 4059
Kasperson, Roger 4009, 4059, 4091
Katz, Cindi R. 3083, 4097
Katz, Yossi 5033
Kay, Jeanne 3074, 4080
Kay, Paul A. 3029, 4058
Keables, Michael J. 3096
Keall, Peggy 3011
Kearney, Michael S. 3122
Keating, Michael 3059
Keifer, MaryBeth 2027
Keiffer, Artimus 4023
Keil, Donald 3045
Keil, Roger 3082
Keim, Barry D. 3138
Keinath Jr., William F. 5027
Keller, C. Peter 3146, 5103
Kellerman, Aharon 2040
Kellner, Patricia 5018
Kelsey, Michael L. 5023
Kemp, Karen 4124
Kennedy, Christina Beal 4055
Kennedy, Susan 3062
Kenny, Judith 2039
Kent, Robert B. 4031
Kenzer, Martin S. 3057, 3091, 4061, 4082, 4092, 4122, 5019, 5053, 5084, 5101, 5112
Kerr, Greg 3096
Kessler, Edwin 5095
Khan, Belayet H. 2064
Khan, Chandra C. 3136
Khinchuk, Ksenya 4006
Khosrowshahi, Said 1006
Kie, Clayton 5055
Kilcoyne, John R. 3093
Kim, Hak-Hoon 3014
Kimerling, Jon 4018
Kimmel, Jim 5077
Kimsey, Mary B. 5085
Kindquist, Cathy E. 3111
King, Roger H. 4111
Kingsley, G. Thomas 3150
Kirby, Andrew 3085, 4035, 4050, 4097, 5067
Kirchherr, Eugene 4019
Kirsch, Scott 3103
Kjerne, Daniel B. 3045
Klak, Thomas C. 4086
Klinger, Lee 4065, 4098, 4126
Klinkenberg, Brian 4015, 4049
Kliot, Nurit 4082
Klohn, Werner 5107
Knapp, Gregory 5046
Knapp, Paul A. 4042
Knight, David B. 2062, 3120, 3156, 4044
Knights, Peter R. 3008
Knopp, Lawrence 4119
Knox, James C. 3092
Knox, Paul 4109
Knudsen, Daniel C. 4011
Knuth, Paul D. 3089
Kodras, Janet E. 3131, 4011
Koloutsou-Vakakis, Sotiria 5055
Kominiak, Tara A. 5040
Konrad, Doug 5073
Konrad, Victor 3057, 3111
Kontuly, Thomas 4014, 4129
Koop, Theano Terkenli 2039
Koos Jr., Philip D. 5050, 5073
Korcelli, Piotr 5070
Kornhauser, David 5108
Kotlyakov, Vladimir M. 4041, 4121
Kovacik, Charles 4087
Kozak, Rita M. 4118, 5040
Krakover, Shaul 5021
Kral, Vaclav 5070
Kraly, Ellen Percy 3061, 3097
Krausse, Gerald H. 4073, 5094
Krim, Arthur 2039, 4031
Krmenec, Andrew J. 3013, 3118, 3152, 5051
Kromm, David E. 5058
Kruger, Darrell P. 4125
Kuby, Michael 5087
Kuhlken, Robert 3018
Kuhn, Richard G. 5090
Kuhn, Werner 4128
Kujawa, Richard 5027
Kukla, George 2042
Kulkarni, Gopal S. 4052, 4116
Kumler, Mark P. 5064
Kummer, David M. 2026
Kung, Hsiang-te 3164
Kupfer, John A. 3129
Kureth, Elwood J.C. 3088
La Courreye, Paul 5015
Ladavalya, Bhansoon 3015
Ladochy, Steve 2042, 3110
Ladson, Anthony R. 3158
Laituri, Melinda 5053
Laity, Julie E. 3025
Lake, Robert W. 3071
Lakhan, V. Chris 4022, 5115
Lakshmanan, T.R. 3141
Lall, Amrit 4024, 5105
Lam, Nina Siu-Ngan 3098
Lamb, Richard 5127
Lamme III, Ary J. 4112
Lammers, Richard 4018
Lampe, Fred A. 2050
Lanegran, David A. 4016
Langlois, Andre 3120
Langran, Gail 2016
Langran, Kenneth J. 3151
Langworthy, Robert 3173
Lansana, Florence 5050
Lant, Christopher 2030
Lapen, David R. 3039
Larson, Albert J. 3163
Larson, Elizabeth M. 5105
Larson, Robert C. 3143
Last, Donald 4027
Lathrop, Richard 3151
Latz, Gil 4070, 5108
Lauria, Mickey 3041, 4119, 5013
Lauzon, Jean Paul 3078
Lavin, Stephen 4031
Lavin, Terrianne 3136
Lavine, M.P. 3164
Law, Jane 4043
Law, Mark N. 3094
Law, Robin M. 3027, 3082
Law-Evans, Elizabeth 5031
Lawrence, Henry W. 4070
Laws, Glenda 3141, 5060
Lawson, Victoria 5014
LeBeau, James L. 3173
LeBoutillier, David W. 3073
Leahy, Palmyra M. 4112
Leaman, J. Harold 3075, 4020
Leathers, Daniel J. 4099
Lecce, Scott A. 4072
Ledent, Jacques 4024
Lee, Jay 4018
Lee, Jeffrey A. 3158
Lee, Jessica P.L. 4102
Lee, Russell 5092
Leech, Janie Webster 3136
Legates, David R. 3138, 4067
Leib, Jonathan 5074
Leigh, David S. 3025
Leigh, Nancey Green 2051
Leinbach, Thomas R. 2026, 3069, 4095, 4112, 5007
Leitner, Helga 4088, 4117, 5067, 5099
Lemon, James 3051, 3109
Lentnek, Barry 2049
Lenz, Ralph 3069
Leon, Bill 3142, 3166, 5039, 5073
Leonardi, G. 4030
Leung, C.K. 4102

INDEX

Leung, Yee 3100
Levine, Gordon L. 5069
Lew, Alan A. 5109
Lewandowski, James 3133, 5085
Lewington, Tim 3083
Lewis, G. Malcolm 3057, 4075
Lewis, Laurence A. 5046, 5093
Lewis, Lawrence T. 3018
Lewis, Martin W. 2026
Lewis, Nancy Davis 3020, 5034
Lewis, Richard T. 3072, 4112
Lewis, Robert 5081
Lewthwaite, Gordon R. 3028, 5100
Ley, David 4045
Leyshon, Andrew 2023, 4051
Li, Bin 5087
Li, Peiji 2042
Liang, Y. 3141
Liaw, Kao-Lee 3047
Libbee, Michael 2050
Liebowitz, Ronald 3058
Lier, John 3134
Lightfoot, Dale 3105
Lightfoot, James E. 3064, 5096
Lighthall, David 3116
Limbird, Art 3135
Lin, H. 3151
Lindberg, David R. 4015
Lindberg, Mark B. 3062
Lindenberg, Richard E. 5086
Lineback, Neal 4112
Lins, Katherine 3125
Lipschutz, Ronnie 4060
Little, Jo 3141
Liu, Cheng 4042, 5092
Liu, Kam-biu 3007, 4017
Liu, Zhi-jun 4017
Liverman, Diana M. 3074, 4089, 5082
Liverman, Diana M. 3150
Livingstone, David N. 5053
Lizarraga, Jorge G. 4028
Lloyd, Andrea H. 3060
Lloyd, Robert 5086
Lloyd, William J. 4071, 5088
Lo, C.P. 3124, 3160, 3176, 4046, 4102, 4136, 5056, 5106
Lo, Lucia 3005
Lo, Miriam K. 2050, 3069, 3160
Lockwood, Catherine M. 3165
Lofstedt, Ragnar 5006
Logan, Bernard I. 3075
Lolonis, Panagiotis 2033
Lombard, John 3118
Lombard, John R. 4069
Lonergan, Steve C. 3130, 3150
Long, Brian Kent 3133
Long, John F. 3097
Long, Larry 4014
Longley, Paul A. 3098
Longwell, A. Richard 2049, 4068, 4139
Loomer, Scott 5016
Lorenz, Jay R. 3028
Lott, Dale R. 2039
Louder, Dean 3156, 5071
Lougeay, Cheryl Walley 3143
Lougeay, Ray 3143
Lovell, W. George 2035
Lovelock, James E. 4065
Lu, Jonathan J. 3028, 4081, 4146
Lucas, Peter 5127
Luciuk, Lubomyr Y. 2063, 3061, 4082
Luckman, B. H. 3007
Luk, Chiu-ming 5108
Luk, Shiu-hung 4043, 5009, 5056, 5106
Lulla, Kamlesh 3012, 4042, 4107, 4141
Luman, Donald E. 4096
Lusch, David P. 1005, 2003
Luymes, Martin 4106
Lycan, Richard 5064
Lyons, Donald 5017
MacCabe, Charles L. 3134
MacDonald, Glen 3007, 5005
MacEachren, Alan M. 3162
MacKinnon, Ross 4030
MacLachlan, Ian 5061, 5091
MacLock, R. Bruce 4079
MacPherson, Alan 2011, 3101, 3118
Macdonald, Gerald M. 2013
Macey, Susan 3150, 4058, 4090, 4103, 5090
Mackaness, William A. 2036
Mackay, J. Ross 4072
Mackenzie, Suzanne 5099
Maclaren, Virginia W. 5015
Magilligan, Frank 3122
Maguire, Robert E. 4089, 5071
Mahaffey, Charles G. 4012
Maire, Bernard 3144
Majury, Niall Charles 2063
Malanson, George P. 3005, 3115, 4131
Mallett, William 5067
Malmstrom, Vincent H. 3077, 5060
Mandel, Rolfe 4111
Maniates, Michael 4060
Mansfeld, Yoel 4143
Manson, Alex 3059
Manzo, Joe 5034
Maraffa, Thomas 4066
Marble, Duane F. 3012, 3078
Marceau, Danielle 4042
Marchand, Claude F. 5060
Marcus, Melvin G. 2004, 3039, 3159
Marcus, W. Andrew 3122
Margulis, Harry L. 4106, 5043
Mark, David M. 4007, 4015, 4048, 4049, 4128
Markusen, Ann 4011, 5128
Marois, Claude 4087, 5122
Marshall, John 3176
Marshall, Mary L.M. 5031
Marston, Richard 3039, 3096, 4108
Marston, Sallie A. 2043, 5052, 5081, 5110
Martin, Judith A. 3011
Martin, L. R. G. 4107
Martin, Michael 4070
Martin, Walter 3110
Martinson, Tom L. 2049
Martis, Kenneth C. 5074
Martz, L.W. 3039
Marx, Robert W. 3078
Maso, Carmen 3138
Mason, Randall 3086
Mason, Robert J. 3147
Massam, Bryan H. 2067
Massicott, William 4051
Masucci, Michele M. 3063
Matchak, Stephen 3064
Mather, Cotton 3057, 4069, 4120
Mather, John R. 4122
Mathewson, Kent 4012, 5049
Matsuura, Kenji 5020
Matthew, Malcolm R. 3011
Matthews, Olen P. 3112, 4010
Matthews, Stephen A. 5057
Mattingly, Doreen J. 4024
Mattingly, Paul F. 3028
Matzke, Gordon E. 4134
Maurer, Jeanne 4020
Mausel, Paul W. 4042
Maxfield, Donald W. 4027
Maxfield, O. Orland 2030, 3140
May, David W. 3070
Mayer, Harold M. 5069
Mayer, Jonathan D. 3020, 4109
Mayer, Tamar 5033
Mayo, James M. 4075
McCabe, Gregory J. 3125
McClure, Robert 3088
McConnell, James E. 2011
McCracken, Kevin 4106
McCroskey, Stewart K. 5077
McDade, Barbara E. 3075
McDonald, Douglas B. 3066
McDonnell, Jeffrey J. 3115
McDowell, Linda 4123, 5099
McDowell, Patricia 4127
McGee, T. G. 3069
McGlade, Michael C. 2042
McGranaghan, Matthew 4015, 4048, 4128, 5086
McGreevy, Patrick 5018
McGregor, John R. 3013
McHaffie, Patrick H. 2028
McHugh, Kevin E. 3021, 3047, 4074, 4130
McIlwraith, Thomas 2008
McKay, Patrick J. 3119
McKay, Robert R. 3153
McKeown, Larry E. 3046
McKnight, Susanna 4131
McKnight, Tom L. 4083
McLafferty, Sara 5072
McMaster, Robert B. 2016, 2036, 4061
McNally, Mary 4010
McNaughton, Rod B. 3101, 5061
McNeill, Fiona 3113
McTaggart, W. Donald 2048
Meade, Melinda 3136
Meaney-Leckie, Anne 5008, 5062
Mearns, Linda O. 4098
Medford, Omie E. 4026
Medvedkov, Olga 4006, 4110
Medvedkov, Yuri V. 4110

PARTICIPANTS

Meehan, Grady B. 4042
Meeks, Harold A. 3066
Meentemeyer, Vernon 3017
Mehretu, Assefa 4116
Meier, Bruce W. 4042
Meierding, Thomas 5120
Meinzen-Dick, R. 2041
Melamid, Alexander 4105
Menzies, Rodger K. 4051, 4093
Mercer, John 1008, 3051, 3148, 5017
Merchant, James W. 4064
Merrens, Roy 2021
Merz, Wolfgang 5093
Meserve, Peter H. 3112
Metz, John J. 5044
Meyer, David R. 4094
Meyer, Douglas K. 3008, 4075
Meyer, Judith W. 3030, 4103
Meyer, William B. 4059, 4121
Meyer-Arendt, Klaus J. 5042
Michaels, Sarah 3094
Michaelsen, Joel 3138, 5031
Michel, J. 3151
Michelson, William 5068
Micklin, Philip 3171, 4100
Micuda, Thomas B. 4013
Middlekauff, Bryon D. 5027
Mielke, P.W. 5031
Miller, Andrew J. 3122
Miller, Barbara Keller 5101
Miller, Byron 4062
Miller, Cynthia A. 4021
Miller, E. Willard 4113
Miller, Glenn R. 5117
Miller, Harvey J. 4030
Miller, Katherine J. 3143
Miller, Mark M. 5101, 5112
Miller, Raoul 3029
Miller, Roger 5129
Miller, Roger L. 5039
Miller, Ted R. 3150
Miller, Theodore K. 3158
Miller, Thomas E. 5004, 5120
Miller, Tomas A. 3159
Miller, Vincent P. 4052, 4085, 4116
Mills, Gerald 5054
Milne, Simon 5025
Mings, Robert C. 3047, 5109
Miron, John 4045
Mitchell, Clare 5088
Mitchell, Don 5110
Mitchell, James K. 2055, 5041
Mitchell, Lisle S. 5080
Mitchell, Michael S. 4132
Mitchell, Robert C. 4091
Mitchell-Morris, Olivia 3144
Mitchneck, Beth 3024
Mock, Cary Jeffrey 3017
Modarres, Ali 4029
Moellering, Harold 4018
Moen, Olof 5023
Mofson, Phyllis 4101
Mohler, Robert R. J. 4042
Molenaar, G. 5023
Momsen, Janet Henshall 4080
Monahan, Robert L. 3164
Monk, Janice 4054, 4080
Monmonier, Mark 5072
Monroe, Charles B. 5116
Monte-Mor, Roberto L. 4019
Montz, Burrell E. 3143
Monzel, Kristen L. 3061
Mookherjee, Debnath 3075, 4051
Moon, Henry 5008
Moore, Conrad T. 3017
Moore, Eric G. 3021, 4074
Moore, Ian D. 3158
Moore, Laurence 3113
Moore, Tyrel G. 3054, 5126
Morales, Rebecca 3130
Morehouse, Barbara 2030
Moreira, M. Eugenia S.A. 3089
Morgan, John 4112
Morlan, Janet C. 3060
Morley, David 5039
Morrill, Richard 4074, 4084, 5021
Morrill, Robert W. 3093
Morris, John 3061
Morris, Scott E. 4108
Morrisette, Peter M. 4009
Morrison, Hunter 5043
Morrison, Joel L. 3078, 4061, 4084
Morrow-Jones, Hazel A. 3027, 3126
Moser, K. A. 5005
Mosher, Anne E. 5110
Moss, Anne K. 3014
Moss, Michael 2026, 4095
Moss, Pamela 3141
Mountain, Keith R. 5095
Mower, James 3062, 3162
Muckleston, Keith W. 3112, 3164
Mudderman, Denis E. 5063
Muir, Tom 3044
Mukhopadhyay, Anupa 5079
Mulhern, Theresa 3104
Mullens, JoBeth 2030
Muller, Jean-Claude 2036
Muller, Keith D. 3133
Muller, Robert A. 4092, 4122
Mulligan, Gordon F. 3014
Mulligan, Linda 2039, 5117
Mulville-Friel, Diane 4112
Munski, Douglas C. 5119
Munton, Richard 4118
Murauskas, G. Tomas 5015
Murphy, Alexander B. 4044, 5107
Murphy, Peter E. 3043, 3146, 4143
Murton, Brian 5028
Mushkatel, Alvin H. 4026
Myers, Garth A. 5113
Myers, Jeff 3151
Myers, Robert R. 3024
Myers-Jones, Holly J. 5017
Naim, Shamim 1005, 2003
Najjar, Yaser M. 3015, 3043
Napton, Darrell 3147, 4087, 4118
Nardi, Marc 3026
Narey, Martha A. 4133
Nash, Alan 4024
Nash Sr., Peter Hugh 5129
Nast, Heidi J. 4023
Naukkarinen, Arvo 3081
Nava, Kathryn E. 5113
Needham, Roger 3094, 5121
Nellis, M. Duane 2053, 3066, 3147, 4042
Nelson, Frederick E. 3039
Nelson, J. Gordon 3084, 5118
Nemeth, David J. 5018
Newbold, K. Bruce 3047
Newcomb, Robert M. 4023
Nicholas, Joseph William 3039
Nichols Jr., Woodrow W. 2040
Nickerson, Bradford 2036
Nicol, Heather 3067
Nietschmann, Bernard 3022, 5101
Nigg, Joanne 4026
Nijman, Jan 3128
Nipper, Josef 4117
Noble, Allen G. 5044
Noble, William A. 5079
Nolan, Mary Lee 3106
Nolan, Robert 5088
Norcliffe, Glen 2021
Noronha, Valerian T. 5092
Norris, Darrell A. 2050, 4023
Norris, Robert E. 3087, 5074
North, Robert N. 3123
Norwine, Jim 3039
Nunley, Robert 3099, 5064
Nyerges, Timothy 2016, 3114
Nystrom, David A. 5130
Nystuen, John D. 3069, 4042
O hUallachain, Breandan 3118
O'Brien, Eileen M. 4104
O'Brien, Karen L. 3023
O'Brien, Larry G. 3045
O'Cinneide, Micheal 4085, 4116
O'Connor, Anne V. 3165
O'Ferrall, Andrea M. 4143
O'Kelly, Morton 5092
O'Leary, John F. 4131
O'Loughlin, John 3128
O'Neill, Michael P. 3016, 3161
O'Sullivan, Patrick 4044
Oaks, Sherry D. 5082
Oberhauser, Ann M. 3101, 4117, 5078
Obermeyer, Nancy J. 3004, 5063
Odland, John 3076, 5021, 5057
Oh, Jongwoo 5120
Ohno, Ryuzo 5041
Ojala, Carl F. 3088
Oke, T.R. 5020, 5054
Oldakowski, Raymond Keith 5097
Olds, Kris 5073
Oliver, John E. 4122
Oliver, Virginia L. 3143
Olsenholler, Jeffrey A. 1005, 2003, 3104
Olson, Howard E. 5069
Olson, Judy M. 1002
Olson, Sherry 3067, 4106, 5110
Olson, Susan E. 5113
Olyphant, Greg A. 4108

NUMBERS REFER TO SESSION NUMBER

INDEX

Oneto, Gilberto 5041
Orf, Thomas R. 4128
Organ, David 4028
Orme, Amalie Jo 4127
Orme, Antony R. 4127
Ormrod, Richard K. 3026
Osborne, Philip D. 3154
Osei, William Yaw 5121
Oshiro, Kenji K. 5108
Osleeb, Jeffrey 3114, 5012
Ossenbruegge, Juergen 3137
Ostry, Bernard 2067
Otok, Stanislaw 4093
Outcalt, Samuel I. 3039
Owen, Wayne R. 4017
Padoch, Christine 5102
Pahlavan, Dominique 4131
Painter, Joe 3145
Palecki, Michael A. 4099
Palm, Risa 5041
Palmer, James F. 5041
Palmer-Moloney, Jean 3163, 5027
Palmieri, Richard P. 5044, 5079
Pandit, Kavita 5055
Pannell, Clifton W. 3124, 4100, 5056
Papageorgiou, Y. Y. 4030
Pappas, Katina 3143
Parisi, Peter 5088
Park, Siyoung 5094
Parker, Anne Zonne 5044
Parkes, Don 5030
Parolin, Bruno P. 5069
Parry, Peggy K. 4118
Paskaleva, Krassimira 5104
Passini, Romedi 5030
Pathirana, Sumith 4042
Patterson, John G. 5033
Pattie, C. J. 5076
Paul, Alan 3149
Paul, Bimal Kanti 5089
Pavlakovic, Vera K. 3052, 3087
Pavlik, Claire Ellen 3101
Pavlowsky, Robert T. 5024
Peach, James T. 3087
Pearson, Ruth 4054
Pease, James R. 3147
Pederson, Leland R. 3052, 3087
Peet, Richard 3139, 3174, 5099
Pelone, Michael S. 3044
Penrose, Jan 5075
Pentney, R. 3161
Peplies, Robert W. 3045
Perez, Francisco L. 4043
Perle, Eugene D. 5022
Perritt, Richard W. 3130
Perry, Carolyn 4076
Persson, Kent 5023
Petchenik, Barbara B. 3078, 4048
Peters, Evelyn 3021, 3048
Petersen, James F. 3105
Peterson, Gary G. 4042
Peterson, Michael 5016
Pfister, Robert E. 2031
Phelps, Nicholas 5091
Phillips, Jonathan 3158
Phillips, Lynn R. 4022
Phillips, Robert 5059, 5115
Phipps, A.G. 5067
Phipps, Michel 3098, 3127, 3161
Pickett, James E. 4075
Pickles, John 2038
Piepenburg, Kurt 4115
Pierce, John T. 3143
Pietravoia, Frank 5043
Pigozzi, Bruce 4005
Pijawka, K. David 4026
Pillsbury, Richard 3088
Pincetl, Stephanie 3071
Pinedo-Vasquez, Miguel 5102
Pitman, Beverley 3082
Place, Susan E. 4054, 5049
Plane, David A. 3126, 3170, 4074, 5097
Platt, Rutherford H. 3094, 4021
Plumb, Gregory A. 3039, 4073
Pochop, Larry 3096
Pogacnik, Andrej 5041
Poon, Jessie 5021
Poracsky, Joseph 4104
Porter, Philip W. 3168, 4009, 4097
Poulsen, Thomas M. 3077
Prante, Mary Catherine 5016
Pratt, Geraldine 5099
Precht, Francis 4042
Pred, Allan 3139, 4023
Preston, Valerie 3141, 5072
Price, Bradford S. 3044
Price, C. 3125
Price, Kevin P. 4064, 4096, 5011
Price, Marie Daly 5029
Prorok, Carolyn V. 3106
Prosser, Rudolph P. 3117
Proulx, Luce 5060
Pryde, Philip R. 3024, 4115
Pryor, Edward T. 3097
Psuty, Norbert P. 3089, 3119, 5084
Pucci, Frank J. 3072
Pugliese, Paul 2002, 5103
Qiu, Hong-lie 3098, 5106
Quackenbush, M. 3161
Quam, Joel 3145
Quandt, Carlos 3130
Quinn, Frank 3053, 4079
Radford, John P. 3067, 5060
Ragaz, Cheri 4082, 4097, 5112
Rahman, Atiar 2064
Rainey, Steven J. 5046
Ralston, Bruce A. 4042, 5026
Ralston, Linda 4042
Ramphall, Davin 3015
Ramraj, Robert 3112
Ramsey, R. 3151
Ramsey, R. Douglas 5011
Rand Jr., Willie B. 3164
Randall, James E. 4005, 5078, 5128
Rapai, Robin J. 4042
Raphael, Marilyn 3023
Ratick, Samuel J. 4026, 4059, 4091, 4121
Raup, Henry A. 5128
Ray, Arthur J.(Skip) 3080, 4080
Ray, Brian 3021
Ray, Sumanta 4019
Rayner, John N. 4053, 4092
Reader, Steven 3113, 5057
Rebertus, Alan J. 2027
Reed, Maureen G. 5128
Reeder, Philip P. 5120
Reeves, Richard W. 3092, 3122, 3158
Reeves, Wayne C. 3165
Regulska, Joanna 3031, 4006, 4054, 4119
Reichert, Dagmar 5129
Reid, Marion S. 2027, 3039
Reid, Neil 3101
Reiman, Robert E. 4052, 4116
Reiter, Kimberly 5075
Reitsma, Hendrik-Jan A. 4019
Rekers, A.M. 5061
Relph, Edward 5083
Rengert, Arlene C. 3173
Rengert, George 3173, 5068
Rense, William C. 3143
Renwick, William H. 5024
Rey, Serge 5111
Reynolds, Dave R. 4094, 5052, 5076
Reynolds, William J. 4073
Rhoads, Bruce L. 3092
Ribot, Jesse 4060
Rice, Keith W. 4027
Richards, Curtis W. 5032
Richardson, Diane 2036
Richardson, Douglas 3022
Rickard, Timothy J. 4118
Ricklis, Robert A. 4125
Riddell, Barry 3128, 5105
Riebsame, William 4009, 4090, 5041
Rieck, Richard L. 4029, 5004
Rigby, David L. 4011
Riggan, Philip 3151
Rincon, Carlos 3064
Rinschede, Gisbert 3106
Ritchie, J. C. 3007
Ritter, Michael E. 2042
Ritter, Niles 3004
Rivizzigno, Victoria L. 5119
Robb, Joe 3026
Roberge, Roger A. 3133, 3161, 4105
Robert, Andre 3098
Roberts, Charles 4107
Roberts, Michael C. 5124
Roberts, Rebecca S. 3116, 3147
Roberts, Susan 3042, 4086
Robinson, Arthur H. 4061
Robinson, David A. 2042, 3023, 5031
Robinson, Jennifer M. 4098
Robinson, K. 3125
Rocheleau, Dianne 4089, 5010, 5047
Roder, Wolf 4132
Rodgers, Allan 4110
Rodrigue, Christine M. 3143, 4113
Rogers, Jeffery C. 4067
Rogerson, Peter 3076, 3126, 4030
Rogovin, Martha 3110
Rollinson, Paul A. 4103

PARTICIPANTS

Roman, Joseph D. 5043
Romanos, Michael 3018, 3048
Romey, William D. 2037, 3066
Romsa, Gerald 4117
Rooney, John 3088
Rose, Courtice G. 3066, 3091
Rose, Damaris 4045, 4123
Rose, Gregory S. 3008
Rosen, Carol J. 3165
Rosenblatt, Roger A. 4109
Rosenvall, L.A. 3079
Ross, Thomas 3054, 3143
Roulet, Nigel 2006, 2007, 2020
Rovai, Eugenie 4042
Rowe, Clinton M. 3039
Rowe, Stacy 3027
Rowland, Richard H. 4110
Rowles, Ruth Anderson 3062
Rowley, Gwyn 4062
Rowntree, Lester B. 5066
Roy, Alain P. 3098, 3127, 3161
Roy, Andre G. 3098
Rubenstein, James M. 3143
Ruddick, Susan 3027
Rudel, Thomas K. 3151
Rudzitis, Gundars 5097
Rumney, Thomas 3066, 4100, 4135
Rundquist, Donald C. 4064
Rundstrom, Robert A. 3140, 4133
Rushton, Gerard 3076, 4007
Russell, Peter L. 4075
Ryan, John 3053
Sack, Dorothy 3039
Sagers, Matthew 3058, 4066
Saku, James C. 3142
Salem, Gerard 3144
Salisbury, Lance 4132
Salmon, Scott 5067
Salter, C.L. 5126
Salter, Paul Sanford 3145
Samawi, Habis S. 3043
Sambrook, Richard Alan 5121
Samuels, Marwyn 3176
Sanders, Rickie 2029, 4068, 5008
Sandhu, J.S. 3065
Sargent, Charles S. 2048
Sarjeant, Bruce C. 4042
Sauder, Robert A. 4112
Saunders, Ian R. 3103
Savage, Melissa 3115
Scarpaci, Joseph L. 5014, 5101, 5112
Schaetzl, Randall J. 3025, 4111
Schaleman Jr., Harry J. 3018
Schalles, J. 4064
Schatzki, Ted 2038
Schein, Richard H. 4021
Schlemmer, M. 4064
Schlichting, James D. 4115
Schmidt, Jack 3158
Schmiedeler, Tom 4023
Schmitt, James 4108
Schmudde, Theodore H. 4083
Schneider, Dona 3020, 3055, 3144
Schoenberger, Erica 2023
Schoepfle, O. Benjamin 5092
Schofer, Jerry P. 5119
Schoolmaster, F. Andrew 5058
Schretter, Howard 5073
Schreuder, Yda 5110
Schroeder, Kathleen 4005
Schroeder, Kurt 4112
Schroeder, Rolf 3073
Schroeder, Walter A. 2032
Schumacher, Joachim A. 4099
Schwalen, Emily 4027
Schwartz, E. A. 5076
Schwartz, Mark D. 3017, 5038
Schwarz, Bill 3105
Schweithelm, James 4095
Scott, Allen J. 3082, 5025
Scott, James W. 4042
Scott Jr., Ralph C. 2044
Scuderi, Louis A. 3017
Sdasyuk, Galina V. 4091
Seager, Joni 2065
Sechrist, Gail S. 3072
Sechrist, Robert 2051, 3032, 5016, 5051
Sedlacek, Randy 3159
Sela, Nurith 3154
Sell, James L. 5039
Semple, Stuart 4126
Sen, Anindita 5079
Sen, Ashish 3014
Seney, Joseph P. 5093
Serafin, Rafal 5118
Sexton, Rocky L. 3018
Sham, Chi-Ho 3110, 4026
Shanahan, Derek 5105
Shankman, David 3060
Shapira, Philip 5091
Sharpe, Bob 3143
Sharpe, David M. 3129
Shaw, Allaire C. 3132
Shaw, Shih-Lung 5026
Shea, Jannis B. 3143
Shea, K. Stuart 2036
Shea, Philip 3143, 4022
Shelley, Fred 3074, 4044, 5052
Shelton, Marlyn L. 5038
Sheppard, Eric 3148, 4008, 4089, 5013, 5048, 5099
Sheppard, Eric 3068
Sherman, Douglas J. 3089, 4137, 5084
Sherman, John 4061
Sheskin, Ira M. 3132
Shimizu, Ron 3059
Shirey, Ruth I. 4016
Shirley, Lynn 4049
Shrestha, Nanda R. 4057
Shroder Jr., John F. 3151, 4108
Shumsky, L. 4109
Shumway, J. Matthew 3079, 4008
Siddiqi, Akhtar H. 5044
Sierra, Rodrigo 3133
Silberfein, Marilyn 3075
Silvers, Arthur L. 4105
Silverstein, M.C. 5024
Simpson, Stuart 4106
Singhal, A. K. 4042
Sitwell, O.F.G. 3091
Skaggs, Richard H. 4122
Skeeter, Brent R. 5023
Skele, Mikels 4112
Skelton, Dennis L. 3039
Skinner, G. William 3176, 4046
Skipper, Larry 5086
Skopec, Mary 4108
Slater, David 3174
Slowey, Susan C. 5118
Small, Thomas W. 5093
Smardon, Richard C. 5041
Smethurst, Laura 4119
Smilnak, Roberta A. 3093
Smit, B. 3130
Smith, Adrian 3006
Smith, Ben A. 5117
Smith, Bruce W. 4112
Smith, F.M. 5031
Smith, Geoffrey C. 4103
Smith, L. Graham 5015
Smith, Neil 3006, 3048, 3175, 4029, 4050, 4088, 4119, 5099
Smith, Nigel J.H. 4121, 5010, 5047
Smith, Peter J. 3084
Smith, R. 3125
Smith, Richard M. 4031
Smith, Richard V. 3143, 4056
Smith, Terrence 4128
Smith, W. Randy 4083, 4138, 5085
Smith Jr., Everett G. 3143
Snook, Andrew 3088
Snyder, Richard A. 5039
Soffer, Arnon 2063
Soja, Edward W. 2038, 3139, 4050
Solecki, William D. 4026
Solomon, Barry D. 4034, 4058, 4090, 5090
Sommers, Lawrence M. 4116
Sonnenfeld, Joseph 3022
Soot, Siim 3014
Sorenson, Curt J. 3070, 4111
Sorenson, John 5082
Soule, Peter T. 3039
South, Robert 3052
Southgate, Douglas 3133
Southworth, Frank 3150
Speicher, Kate 5030
Spies, Therese 2042
Spinelli, Joseph G. 4112
Spring, James V. 3173
Spyrou, Michael 5127
Stadler, Stephen J. 5095
Staeheli, Lynn A. 2040, 5017, 5052
Stafford, Howard A. 3013, 5025
Stallman, Claudia E. 5050
Stanitski, Diane M. 3159
Steadman, David W. 4104, 4131
Stebelsky, Ihor 4066, 4115
Stein, Benjamin 5113
Stein, Gregory P. 3011
Steinke, Theodore R. 5086
Stephens, James T. 3125
Stern, Herschel 3115

NUMBERS REFER TO SESSION NUMBER

INDEX

Sternberg, Hilgard O'R. 5102
Sternberg, Rolf 5006
Sterritt, Neil 3156
Stevens, Dale J. 5004
Stevens, L. E. 3158
Stevens, Thomas J. 5032
Stillwell, H. Daniel 3143
Stimmell, C.A. 3070
Stine, Roy S. 4087
Stoddard, Robert H. 3106
Stoelting, Paul K. 4027
Stoll, Matthew J. 5038
Stoltman, Joseph P. 4016
Stone, Micheal 5024
Stow, Douglas A. 4096
Stowers Jr., Dewey M. 3018
Straussfogel, Debra 5129
Streiner, David 5118
Strohmayer, Ulf 3086
Strong, William R. 4016
Stroud, Hubert B. 5127
Stubbles, Russell L. 5100
Stump, Roger W. 3072
Sturgeon, Tim J. 3102
Stutz, Frederick P. 2037, 5032
Suckling, Philip W. 4042, 5020
Sudar, Anne 3044
Sugiura, Noriyuki 3102
Sukhwal, Bheru 4100, 4120
Summerby-Murray, Robert 3067
Susman, Paul 3042, 4086
Sutherland, Ross A. 5093
Svendsen, M. 2041
Swain, Harry 3080
Swearingen, Will D. 4132
Taaffe, Edward J. 5021
Takahashi, Lois M. 3027
Tan, Kok Chiang 3124, 5056
Tanaka, Kyoko 5085
Tao, Qiang 4042
Taylor, Alan H. 2027
Taylor, Bruce 3155
Taylor, James R. 5016
Taylor, Peter J. 3174
Taylor, S. Martin 3055, 5118
Tchakerian, Vatche 3025
Templer, Otis W. 3143
Terich, Thomas A. 3119
Terry, Ron 3012
Tettey-Fio, E. L. 2033
Thaller, Michael 5032
Theil, Henry 4063
Thill, Jean-Claude 2047, 3113
Thom, Derrick J. 5059
Thomas, Gerald A. 4086, 4143
Thomas, Robert N. 5115, 5121
Thomas, Sharon M. 5023
Thompson, Chris 5045
Thomson, K.W. 4079
Thornton, Patricia A. 3067
Thouez, Jean Pierre 3144, 5122
Thrall, Grant Ian 3045, 3114, 4063, 5092
Thrift, Nigel 2023, 3042, 3139, 3174, 4051, 5099
Thrower, Norman J.W. 4061
Thrupp, Lori Ann 4060
Tiefenbacher, John 4026
Timmerman, Peter 4009, 5082
Tippett, Sandra P. 3094
Tipton, Alan 3039
Tiwari, R.C. 5079
Tobias, Thomas J. 4031
Tobin, Graham A. 3033
Tobler, Waldo 4007
Toemmel, Ingeborg 4117
Tomaino, Angela 4101
Tong, Susanna T.Y. 4104
Toops, Stanley 3160, 4019, 4102
Torrieri, Nancy 4133
Toth, Jozsef 5070
Trahan, Richard G. 3026
Trapasso, L. Michael 3133
Travis, David 3017
Trepanier, Cecyle 5071
Trimble, Stanley W. 3092, 3122, 3158, 5084, 5124
Tripathi, Suprabha 5079
Troughton, Michael J. 2, 3116
Tsomo, Tsering 5087
Tuason, Julie 5125
Tuathail, Gearoid O. 3042, 3115
Turbeville, Daniel E. 4021
Turner, Allen C. 4010
Turner, B. L. 4041, 4059, 4091, 4121
Turner, Debbie 4096
Turner, Eugene J. 1002, 4061
Twery, Mark 5026
Tyler, William A. 4064
Tyner, Judith A. 3010, 4031
Ufkes, Frances M. 5076, 5107
Ulack, Richard 4095
Ulbrick, George 3099
Upmeier, Helga 5064
Urquhart, Alvin W. 5100
Uto, Rika 3149
Vachon, Michael H. 3136
Valimont, Kathleen M. 5120
Van Heyningen, A. 3119
Van Keuren, Heidi 3048
Van Kirk, Sylvia 4080
Van Otten, George A. 3054
Vance Jr., James E. 5075
Vare, Taina 3081
Varuska, Marjorie L. 3039, 3096
Vasiliev, Irina 3100
Vaughn, Danny M. 3016
Veblen, Thomas T. 2027, 3060
Veeck, Gregory 3160, 4102, 5056
Veness, April 5022
Venugopal, G. 5044
Veryzer, Dave 3096
Veselka, Robert E. 5029
Viaud, Gilles 3131
Vicero, Ralph D. 4021
Villeneuve, Paul 4045
Visser, Sent 4118
Voeks, Robert A. 5028
Voeller, Donald J. 3143
Vogeler, Ingolf 3081
Voogt, James A. 5054
Vose, Russell S. 4013
Vural, Leyla 3149, 4142
Wagner, Daniel F. 3100
Wahll, Andrew J. 2002
Wahlstrom, Lage 4052
Waits, David A. 3158
Walasek, Richard A. 3143
Waldorf, Brigitte 5116
Waldron, Betty 3063
Walker, Anne 4042
Walker, Gerald 5072
Walker, H. Jesse 3119
Walker, J. Christopher 3150
Walker, Richard A. 3102, 5076
Walker, Robert 2026, 5085
Wall, David 2035
Wall, Geoffrey 3026, 3043
Wallace, William H. 4070
Walsh, Stephen J. 3029, 5011
Walter, Gerald 3015
Walter, Stephen 5118
Walters Jr., William D. 2028
Walthall, Charles L. 3104
Wang, Jixian James 4102
Wang, Su-Chang 4107
Ward, David 4147, 5081
Warf, Barney 3042, 5017, 5052, 5078
Warhus, Mark 2002
Warkentin, John 4037
Warren, Mark S. 4073
Warren, Robert 3097
Warren, William H. 2028
Wasserman, Adrian A. 3016
Waters, Nigel 3004
Waterstone, Marvin 3071, 4105
Watkins, John F. 3047, 4112, 4130
Waylen, Peter 2042, 3073, 3088, 3096, 4053
Weaver, David B. 3146
Webber, Michael 5048
Webber, Scott R. 4067
Webster, Gerald R. 5045
Weibel, Robert 2016
Weightman, Barbara A. 3072
Weinkauf, Ronald A. 4027
Weirich, Frank H. 3092
Welch, Joan M. 4042
Welford, Mark 5024
Wellar, Barry 3049, 3084, 4007, 4084
Wendland, Wayne M. 4092
Wepfer, Anita Joan 5062
Werner, Robert 3099
Wescoat, Jr., James L. 5083
Western, John 3006
Westman, Walter E. 4131
Westmoreland, Sally J. 4096
Wheeler, Douglas J. 3099
Wheeler, James O. 3152, 5072
Whitaker, Victoria A. 5115
White, Allen L. 3059, 3094
White, Dale A. 3125
White, Gilbert F. 4041, 4059

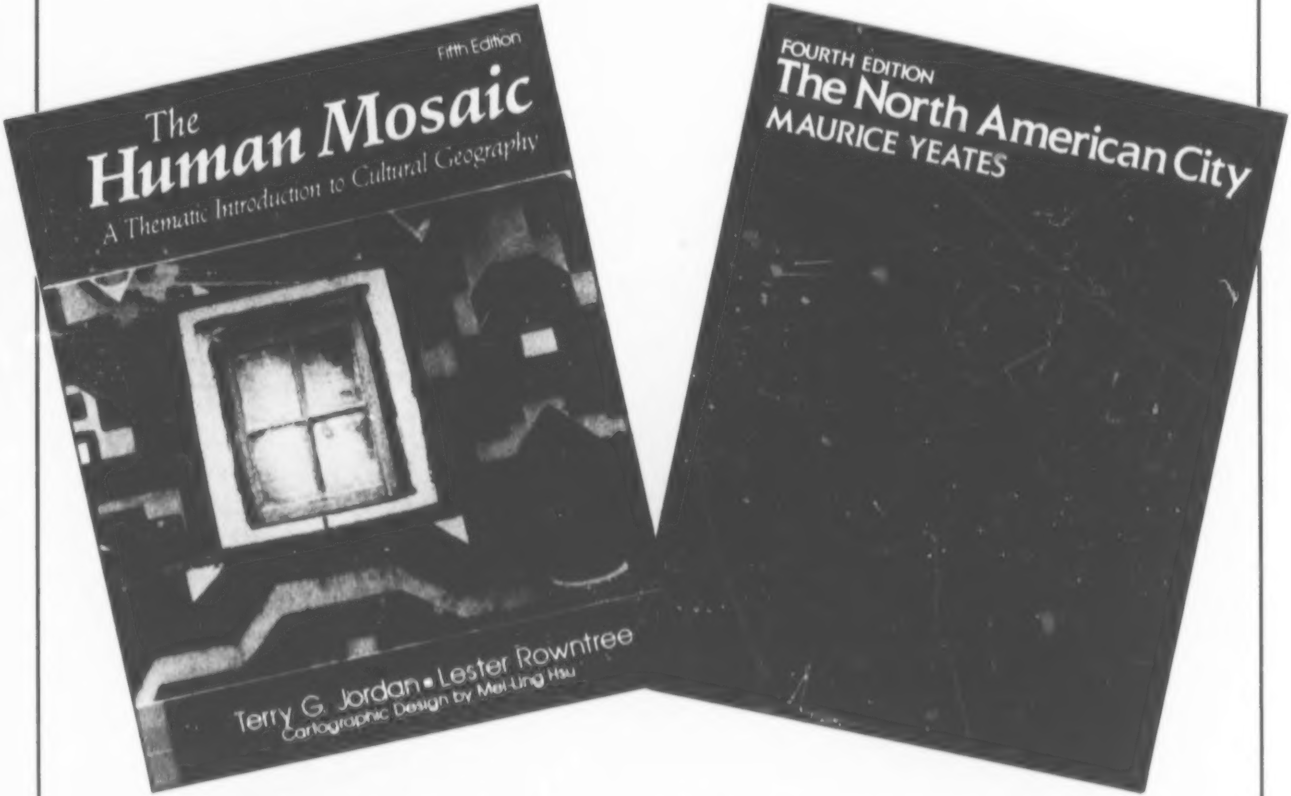
PARTICIPANTS

White, Norman 5118
White, Rodney R. 4132
White, Stephen E. 5058
Whitmore, Thomas M. 5075
Whitney, Joseph B. 5015, 5056, 5087, 5106
Whyte, Anne V. 4041
Wiberg, Ulf 4085, 4116
Widdis, Randy 3008
Wiedel, Joseph 5030
Wiener, John D. 3022
Wije, Chand 5100
Wikle, Thomas A. 5058
Wilbanks, Thomas J. 4041, 4090
Wilder, Dean G. 5004
Wilkinson, M. Justin 3105
Wilkinson, Paul F. 2031, 5080, 5109
Williams, Harris E. 3110
Williams, Mark T. 4143
Williams, T.H. Lee 3140
Williams, Thomas B. 3039
Willms, Dennis 5118
Willms, S. Manson 3055
Wilms, Douglas C. 4016
Wilmsen, Carl 4091
Wilson, Bobby M. 3131
Wilson, David 5052
Wilson, James R. 4069
Wilson, John P. 3142, 3158, 5093
Wilson, Mark 5022
Wilson, Mark S. 5121
Wimpffen, Janos 3046, 5078
Winchell, Dick G. 2048
Windhorst, Hans-Wilhelm 5107
Winegar, Elizabeth L. 4109
Wingert, Everett A. 3162
Winkler, Julie A. 4013, 4067, 4092
Winsor, Roger A. 3018
Winters, Harold A. 5004
Wiseman, Robert F. 4130
Wishart, David 4080, 5062
Wisner, Ben 3041, 4057, 4089, 5082
Withers, Mark A. 4090
Withington, William A. 5007
Wixman, Ronald 3024
Wohlenberg, Ernest H. 3063, 5022
Wolch, Jennifer R. 3027, 3082
Woldenberg, Mike 3161
Wolman, Gordon 3049
Wolock, D. M. 3125
Woltemade, Christopher J. 5118
Woo, David 3010
Woo, Ming-ko 3096, 3150, 5009
Wood, Antony P. 4026
Wood, Colin J.B. 3015
Wood, Robert 3099
Wood, Susan 5040
Wood, William B. 3061, 4101, 5007
Woodcock, Deborah W. 4126
Woodhouse, Connie 3039
Woodrow, Karen A. 3097
Woodruff, Jason Michael 3154
Woods, William I. 4112, 5009
Woodward, Rachel 3006
Woolworth, Nancy L. 3054
Works, Martha A. 3163
Wright, Ian A. 5027
Wright, Richard 4042
Wu, Chyan Victor 3062
Wu, Lin 3103
Wu, Qiutao 3013
Wurtele, Susan 3067
Wyckoff, William K. 3135, 3165, 4125, 5029
Xia, Zong-Guo 2041
Xie, Yichin 3155
Xu, Xueqiang 3160
Yamaguchi, David K. 3039
Yamamoto, P. 4064
Yang, Jingli 3104
Yang, X. 3151
Yapa, Lakshman S. 4057, 4089
Yarnal, Brent 4067
Yasmeen, Gisele 5040
Yaukey, Peter H. 4104
Yeates, Maurice 3011, 3084
Yeh, Anthony Gar-On 3160
Yeung, Yue-man 3124
Ying, Long-gen 3164
Yohe, Gary W. 3089
Young, Cyrus W. 4042
Young, Kenneth R. 3060
Young, Liz 5122
Young, Robert A. 3137
Young, Terence 5018
Yu, Chang-ching 5106
Yuan, Pingnan 5106
Yuill, Charles 5026
Zaniewski, Kazimierz J. 4112
Zarin, Daniel 5102
Zeigler, Donald J. 5090
Zelinsky, Wilbur 2254
Zhang, Jidong 5087
Zhao, Yang 3129
Zhu, A-Xing 3135
Zimmerer, Karl S. 4012
Zinn, Frank D. 3069
Zondag, Harry 5061
Zonn, Leo 3169, 4055
Zorn, Jenny 3131
ZumBrunnen, Craig 3077, 4042
Zurick, David N. 3026
Zweifler, Mark O. 5115

NUMBERS REFER TO SESSION NUMBER

Geographically Desirable

Harper & Row is the best place to go for all your geography course needs.
Just take a look at our important *new* editions for 1990:


Fifth Edition
The Human Mosaic
A Thematic Introduction to Cultural Geography
Terry G. Jordan • Lester Rowntree
Cartographic Design by Mei-Ling Hsu
FOURTH EDITION
The North American City
MAURICE YEATES

The Human Mosaic, 5/e
A Thematic Introduction to Cultural Geography
Jordan/Rowntree

The North American City, 4/e
Yeates

Location in Space, 3/e
Theoretical Perspectives in Economic Geography
Dicken/Lloyd

Also by Peter Dicken...
Global Shift
The Changing Map of World Industry

See why Harper & Row is the best place to go for geography texts.
To request examination copies, call **1-800-233-4190.**

1817 **Harper & Row**
The best place to go for Geography

ASSOCIATION OF AMERICAN GEOGRAPHERS
ANNUAL MEETING EXHIBITS
20-22 APRIL 1990

THE SHERATON CENTRE
TORONTO, ONTARIO
CANADA

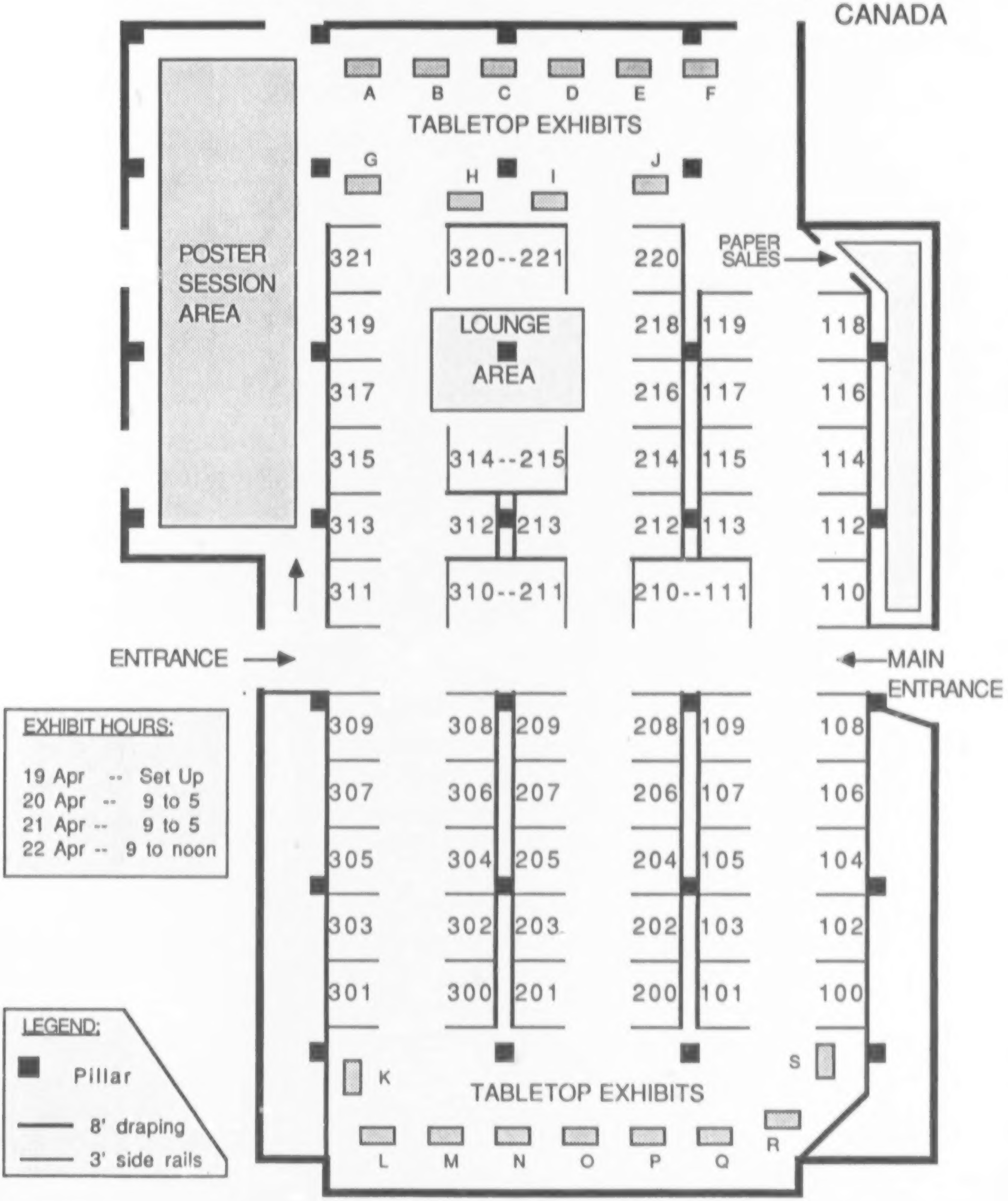

A
B
C
D
E
F
TABLETOP EXHIBITS
G
H
I
J
POSTER SESSION AREA
321
320--221
220
PAPER SALES
LOUNGE AREA
319
218
119
118
317
216
117
116
315
314--215
214
115
114
313
312
213
212
113
112
311
310--211
210--111
110
ENTRANCE
MAIN ENTRANCE
309
308
209
208
109
108
307
306
207
206
107
106
305
304
205
204
105
104
303
302
203
202
103
102
301
300
201
200
101
100
K
S
TABLETOP EXHIBITS
R
L
M
N
O
P
Q
LEGEND:
Pillar
8' draping
3' side rails

EXHIBIT HOURS:

19 Apr -- Set Up
20 Apr -- 9 to 5
21 Apr -- 9 to 5
22 Apr -- 9 to noon

V. EXHIBITORS AND ADVERTISERS

Commercial Exhibitors	Booth No.
Association of American Geographers	307 & 309
Association of American University Presses	311
Basil Blackwell Publishers	104
Bureau of the Census	113
Caliper Corporation	100
Canadian Association of Geographers	312
Canadian Climate Centre	301 & 303
Defense Mapping Agency	302
Digital Resource Limited	305
Elsevier Science Publishing	218
EOSAT	304
Encyclopaedia Britanica	201
ERDAS Incorporated	204
ESRI	310--211
George F. Cram Company Incorporated	118
GIMMS (GIS) Limited	205
Guilford Publications	116
Hammond Incorporated	107
Harper & Row Publishers Incorporated	108
Intergraph Corporation	101 & 103
International Labor Office	119
John Wiley & Sons, Inc. Publishers	210--111
Johns Hopkins University Press	212
Kendall/Hunt Publishing Company	306
Longman Scientific & Technical Publications	210--111
Macmillan Publishing Company	317
Merrill Publishing Company	314--215
Micro-Innovations Incorporated	220
Minnesota State Planning Agency	300
Multi-Concept Designs Incorporated	105
National Council for Geographic Education	213
National Geographic Society	102
PC Globe Incorporated	117
Pergamon Press	110
Ph. D. Associates Incorporated	315
Population Reference Bureau	206
Prentice Hall	112
Rand McNally	319 & 321
Routledge	209
Rowman & Littlefield Publishers Incorporated	214
Saunders College Publishing	216
Strategic Mapping Incorporated	320--221
TYDAC Technologies Incorporated	200 & 202
United Nations Publications	114
University of Chicago Press	106
University of Texas Press	207
University of Toronto Press	313
Unwin Hyman	109
West Publishing Company	308
William C. Brown Publishers	208
World Bank	203
Yale University Press/Oxford University Press	115

Non-commercial Tabletop Exhibitors	Booth No.
AAG Microcomputer Specialty Group	A
American Express Geography Competition	F
American Geographical Society	H
Clark University Graduate School of Geography	C
Geoscience Publications/Louisiana State University	D & E
Institute of British Geographers	I
Miami 1991 Local Arrangements Committee	Q
Miami University (Ohio)	B
Oklahoma State University	L
Ontario Association of Geographic and Environmental Educators (OAGEE)	J
Ontario Ministry of Northern Development and Mines	K
Specialty Group Newsletters	R
Toronto 1990 Local Arrangements Committee / Students T-Shirts	S
University of South Carolina	G

Advertisers

The Association of American University Presses, Inc.
Basil Blackwell, Inc.
Digital Resource Systems Ltd.
Environmental Systems Research Institute, Inc.
ERDAS
Guilford Press
Harper and Row, College Division
Holt, Rinehart and Winston/Saunders
John Wiley & Sons, Inc. - College Division
John Wiley & Sons, Inc. - Scientific & Technical Division
Johns Hopkins University Press
Macmillan Publishing Company
Merrill Publishing Company
Routledge, Chapman and Hall
Rowman and Littlefield
University of Chicago Press
University of Texas Press
Unwin Hyman
West Publishing Company
William C. Brown Publishers
Yale University Press

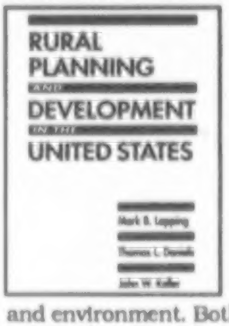
The Geography Program

NEW RELEASES

PAPER EDITION — Ideal for Classroom Use

RURAL PLANNING AND DEVELOPMENT IN THE UNITED STATES

Mark B. Lapping, Thomas L. Daniels, and John W. Keller



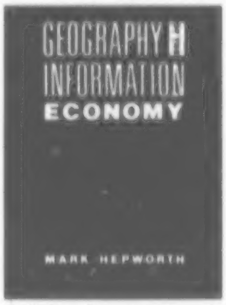
"This book is indispensable to any planner with any interest at all in nonurban areas....The authors describe their book as both a textbook and a 'practical reference'—but it's far more interesting and specific than most textbooks...."
—PLANNING

This comprehensive text describes and analyzes the processes shaping rural America's society, economy, landscape, and environment. Both a text and an introduction to practical skills, it describes how rural America came to be and the ways in which public policy has shaped current reality.

342 Pages,
Hardcover, ISBN 0-89862-384-7, Cat. #2384, $40.00
Paperback, ISBN 0-89862-517-3, Cat. #2517, $19.95

GEOGRAPHY OF THE INFORMATION ECONOMY

Mark E. Hepworth



"This book has great intrinsic merit. Hepworth has integrated the literature from economics, communications, and geography/regional science in a creative and seminal manner. It is a scholarly tour de force...." —*Ronald F. Abler*

This volume provides a geographical perspective on current developments in the information economy, drawing attention to the uneven spatial development and distribution of information, labor, and the electronic forms of information capital.

258 Pages, ISBN 0-89862-786-9, Cat. #2786, $30.00

THE WORLD OF PASTORALISM

Herding Systems in Comparative Perspective

Edited by John G. Galaty and Douglas L. Johnson

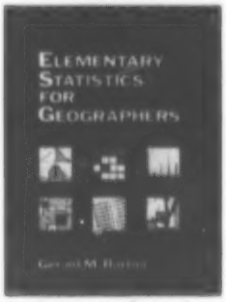
This unique volume focuses on animal husbandry through the lens of culture and economics to explore both global variations in forms of livestock production and the profound commonalities that exist among them. Well illustrated with maps, diagrams, and photographs, the book combines anthropology and geography to describe physical features as well as the social characteristics and experiences of the cultural group.

Approx. 400 Pages, ISBN 0-89862-785-0, Cat. #2785,
Approx. $40.00 (Release Date: June 1990)

WIDELY ADOPTED TEXTS

ELEMENTARY STATISTICS FOR GEOGRAPHERS

Gerald M. Barber



"Offers a refreshing approach to the teaching of elementary statistical analysis to geography students....In my opinion, it offers a substantial improvement over most other statistical geography textbooks."
—*Daniel A. Griffith*
SUNY/Buffalo

Providing a depth of coverage that is remarkable in an introductory text, this book presents not only basic statistical techniques, but also clear explication of the theoretical background of commonly utilized statistical tests.

513 Pages, ISBN 0-89862-777-X, Cat. #2777, $37.50

INTRODUCTION TO REMOTE SENSING

James B. Campbell

troduction to
MOTE SENSING

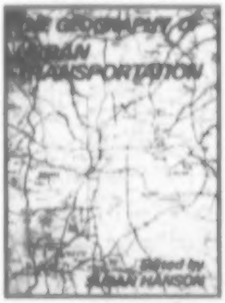
"The value of this text comes from the way that the author has blended basic principles and applications of remote sensing to study earth system problems....Students will not only gain an understanding of the principles of remote sensing, but they will fully understand how to use remote sensing in the study of a broad range of disciplines...."
—THE PROFESSIONAL GEOGRAPHER

The complex and rapidly changing technique of remote sensing is thoroughly documented in this volume.

551 Pages, ISBN 0-89862-776-1, Cat. #2776, $49.95

THE GEOGRAPHY OF URBAN TRANSPORTATION

Edited by Susan Hanson



"This book deserves to become one of the most widely used textbooks in the field of urban transportation....Hanson achieves a near perfect balance of the ingredients needed for a senior undergraduate class in transportation geography or a first graduate class in transportation planning...."
—TRANSPORTATION RESEARCH

Devoted to the geographer's unique concern for understanding movement in urban areas, this book brings together leading scholars in the field who explore the dimensions of the urban transportation problem and present techniques for the analysis of movement patterns.

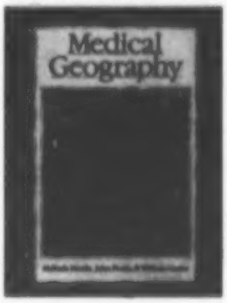
424 Pages, 7" x 10", ISBN 0-89862-775-3,
Cat. #2775, $35.00

from Guilford Publications

WIDELY ADOPTED TEXTS

MEDICAL GEOGRAPHY

Melinda Meade, John Florin, and Wilbert Gesler



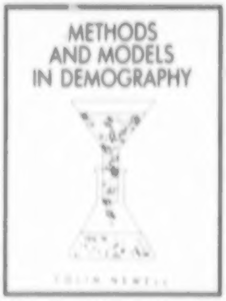
"Meade, Florin, and Gesler have written a valuable overview of the emerging field of medical geography. Their work deserves to be read widely and will be a useful addition to the limited number of textbooks currently available for use in medical geography courses."
—ENVIRONMENT

Applying the geographer's concern for spatial analysis, location and allocation, and human environmental interaction to the study of disease and health care, this is the first broad-based teaching text and professional resource for this vital and growing field.

340 Pages, ISBN 0-89862-781-8, Cat. #2781, $35.00

METHODS AND MODELS IN DEMOGRAPHY

Colin Newell



"This book is well-conceived, well-organized, and well-written. The frequent reminders of the assumptions behind each model are a real strength. Students will appreciate the tone and the organization, and they will find explanations clear. Overall, this is a strong text."
—Judith Friedman
Rutgers University

With illustrations, tables, and data drawn from a wide range of countries in both the developed and developing world, METHODS AND MODELS IN DEMOGRAPHY explicates the potential uses and limitations of the current models for population analysis, estimation, and forecasting.

217 Pages, 1988, ISBN 0-89862-783-4, Cat. #2783, $25.00

SOCIAL AND ECONOMIC DEVELOPMENT

An Introduction

Tony Barnett

"The book covers social as well as economic dimensions of development. It's clarity, readability, and interdisciplinary nature make it ideal for virtually any course dealing with the topic of development."
—Randall Thomson
North Carolina State University

In this stimulating volume, Tony Barnett uses the lens of sociology to demonstrate how various theories cast light on development in the "Third World" and the "Developed World." Clearly written, with wide-ranging examples and case studies used throughout, it is an ideal text for students of Development, Third World, and Area Studies.

232 Pages, 1988
Hardcover, ISBN 0-89862-784-2, Cat. #2784, $35.00
Paperback, ISBN 0-89862-511-4, Cat. #2510, $16.95

ALSO OF INTEREST

PROGRESS AGAINST GROWTH

Daniel B. Luten on the American Landscape
Edited by Thomas R. Vale
366 Pages, ISBN 0-89862-665-X, Cat. #2665, $35.00

PUBLIC HEALTH AND THE ENVIRONMENT

The United States Experience
Edited by Michael R. Greenberg
395 Pages, ISBN 0-89862-778-8, Cat. #2778, $35.00

ETHNOMEDICAL SYSTEMS IN AFRICA

Patterns of Traditional Medicine in Rural and Urban Kenya
Charles M. Good
354 Pages, ISBN 0-89862-779-6, Cat. #2779, $30.00

COMPARATIVE FARMING SYSTEMS

Edited by B.L. Turner, II and Stephen B. Brush
428 Pages, ISBN 0-89862-780-X, Cat. #2780, $37.50

Published in Hardcover and Paperback

PUBLIC PROBLEMS

The Management of Urban Distress
Christopher J. Smith
276 Pages,
Hardcover, ISBN 0-89862-782-6, Cat. #2782, $40.00
Paperback, ISBN 0-89862-924-1, Cat. #2924, $19.95

Instructors' Examination Copies Available

Write to our Academic Coordinator for an examination copy. Send your name, address, phone number, university, course title, and expected enrollment. The book is yours to review for 60 days. If you place a bookstore order for 10 or more copies, you can keep the book as a complimentary desk copy.

Stop by and See These Titles at the Guilford Booth

Address orders and inquiries to:
Guilford Publications, Inc., Dept. 8M
72 Spring Street, New York, NY 10012
or CALL TOLL-FREE 1-800-365-7006
(From Area Codes 212, 718, 516
and 914, call 212-431-9800)

Mapping new ground... atlases from Macmillan Reference

New in 1990

ATLAS OF U.S. ENVIRONMENTAL ISSUES
ROBERT J. MASON and MARK T. MATTSON
132 four-color maps, photos, charts, and graphs, 192 pages, 12" x 10" • ISBN 0-02-897261-9
$80.00 Net until 10/31/90; $90.00 Net after

CONTEMPORARY ATLAS OF THE UNITED STATES
CATHERINE MATTSON and MARK T. MATTSON
62 four-color maps, 88 graphs, 20 tables, 142 pages, 10" x 14" • ISBN 0-02-897281-3
$80.00 Net until 9/30/90; $90 Net after

HISTORICAL AND CULTURAL ATLAS OF AFRICAN AMERICANS
MOLEFI ASANTE and MARK T. MATTSON
85 illustrations, 192 pages, 12" x 10" • ISBN 0-02-897021-7
$80.00 Net until 9/30/90; $90.00 Net after

ATLAS OF COMMUNISM
GEOFFREY STERN
75 commissioned maps, 300 illustrations (150 in color), 256 pages, 8½" x 11" • ISBN 0-02-897265-1
$80.00 Net until 10/31/90; $90.00 Net after

Other Fine Titles

WE THE PEOPLE
An Atlas of America's Ethnic Diversity
JAMES P. ALLEN and EUGENE J. TURNER
Winner of the 1989 American Library Association's Dartmouth Medal
1988 • ISBN 0-02-901420-4 • *$125.00 Net*

THE HISTORICAL ATLAS OF POLITICAL PARTIES IN THE UNITED STATES CONGRESS 1789–1989
KENNETH C. MARTIS
1989 • ISBN 0-02-920170-5 • *$190.00 Net*

THE HISTORICAL ATLAS OF UNITED STATES CONGRESSIONAL DISTRICTS 1789–1983
KENNETH C. MARTIS
1984 • ISBN 0-02-920150-0 • *$190.00 Net*

ATLAS OF BRITISH SOCIAL AND ECONOMIC HISTORY SINCE 1700
Edited by REX POPE
1989 • ISBN 0-02-897341-0 • *$75.00 Net*

ATLAS OF SOUTHEAST ASIA
RICHARD ULACK and GYULA PAUER
1988 • ISBN 0-02-933200-1 • *$95.00 Net*

ATLAS OF THE MIDDLE EAST
MOSHE BRAWER
1988 • ISBN 0-02-905271-8 • *$60.00 Net*

THE ATLAS OF ISRAEL ***Third Edition***
Produced by The Survey of Israel, Tel Aviv
1985 • ISBN 0-02-905950-X • *$185.00 Net*

THE CULTURAL ATLAS OF ISLAM
ISMAIL R. FARUQI and LOIS LAMYA AL FARUQI
1985 • ISBN 0-02-910190-5 • *$115.00 Net*

STOP BY BOOTH #317 and take advantage of our 20% convention discount!

Macmillan Publishing Company
866 THIRD AVENUE, NEW YORK, NY 10022
ATTENTION: DAVE HORVATH
Prices subject to change.

VI. Abstracts

Abstracts (in alphabetical order by first or presenting author) of Papers and Posters presented at the 1990 Annual Meeting of the Association of American Geographers, 19-22 April, Toronto, Ontario.

A PERSPECTIVE ON THE N.C.G.I.A. RESEARCH AGENDA: USE AND VALUE OF GEOGRAPHIC INFORMATION IN DECISION MAKING by Robert T. Aangeenbrug, University of South Florida, Tampa, FL 33620-8100 (Prepared for Panel Discussion on N.C.G.I.A.).

One of the critical elements in getting support for the Center was to argue that spatial information is useful and valuable for the decision making and that current environmental issues must incorporate models from natural and policy sciences.

The initial focus in the proposal is not sufficiently suited to analyze the most common institution which uses geographic information systems (GIS), local government. The literature and documentation in the area of research is only partially developed. Strategies for case studies, surveys and paradigms need to be clarified.

It was successfully argued that the ultimate value and use of GIS will be determined in the policy environment. Social scientists need to articulate how this can be accomplished. The project is both insufficiently funded, staffed and supported for this task. Yet we bear a responsibility to augment these needs.

WHENCE GIS? ALEXANDRIA, PALERMO, ANTWERP, AND MONTFORT by Ronald F. Abler, AAG, 1710 Sixteenth Street NW, Washington, DC 20009-3198 and The Pennsylvania State University.

Contemporary geographic information systems (GIS) embody a quest for ways to record and access data about places that is as venerable as the formal discipline of geography. Claudius Ptolemy's Geography, Al-Idrisi's world map, the Theatrum Orbis Terrarum of Abraham Ortelius, and the research summarized in Vernor C. Finch's Montfort study were the Arc/Info software of their respective eras.

Geography's persistent need for new ways to store, retrieve, and analyze information about places suggests that GIS can enhance most kinds of geographic investigation. Historic and continued separation between cartographers and geographers suggests that breakthroughs in information-handling capacity do not guarantee augmented progress in substantive research.

Capitalizing on GIS requires programs that enlist geographers and GIS experts in joint efforts to develop theory and applications of value to geography, to geographic education, and to GIS.

IS THE CONCEPT OF DETACHMENT-LIMITED EROSION VALID ON SEMIARID HILLSLOPES? by A.D. Abrahams, State University of New York at Buffalo, Buffalo, New York 14260.

Hillslope erosion is detachment-limited when the erosion rate is equal to the soil detachment capacity. Except close to the divide, erosion of the interrill portions of hillslopes is generally assumed to be detachment-limited. This assumption appears to be incorrect on semiarid hillslopes.

Field experiments under simulated rainfall on hillslopes in southern Arizona reveal that actual sediment transport rates in overland flow are less than calculated transport capacities, implying that erosion is detachment-limited. Moreover, experiments on paired plots, one covered with window screen and the other not, indicate that detachment is due predominantly to raindrop impact. It follows, therefore, that if erosion is detachment-limited, the sediment transport rate should be approximately equal to the raindrop detachment capacity. This is not the case. In fact the raindrop detachment capacity greatly exceeds the sediment transport rate for two reasons. First, overland flow covers only a part of the hillslope and is therefore able to reach and remove only a fraction of the soil that is detached by raindrop impact. Second, even where raindrop-detached particles are splashed into overland flow, the largest particles are too coarse to be transported by the flow.

GEOGRAPHY IN THE POLITICAL ARENA by Peter Adams, Department of Geography, Trent University, Peterborough, Ontario, K9J 7B8.

The presentation is part of a panel discussion, "GEO-FACTOR IN PUBLIC POLICY FORMATION". As a Member of the Provincial Parliament of Ontario who is by Training a physical geographer, I have had an unusual opportunity to view public policy from "the inside". While the greenhouse effect and other aspects of environmental change are widely discussed in the media and in the elected assemblies of the democracies, is a background in Geography an advantage? Have Geographers become more influential? Indeed, while "science" appears to become increasingly important in our everyday lives, are scientists of any sort becoming more influential? All will, no doubt, be revealed during the panel discussion.

CANADIAN REFUGEE POLICIES: THE LAST TEN YEARS by H. Adelman, Centre for Refugee Studies, York University, North York, Ontario M3J 1P3.

Canada has a reputation in initiating refugee policy both in number of refugees resettled in Canada in proportion to its population and in overseas assistance. This paper will describe the development of that policy with particular emphasis on the past ten years. It will analyze whether, and if so why, Canada appears to have retreated from being a leader in developing a humanitarian refugee policy.

SPATIAL SNOWCOVER PATTERNS IN THE SIERRA NEVADA AND CASCADE RANGES by Edward Aguado, San Diego State University, San Diego, CA 92182, and Jeff Fleming, University of Wisconsin, Madison, WI 53706.

This study follows up on work presented at last year's AAG meeting. It was hypothesized that persistence in storm track path could lead to opposite departures from normal in snow accumulation at high and low elevations and for northern and southern parts of the Sierra Nevada. Principal components and regression analyses showed that only a weak pattern exists in which differing elevations within the same basin exhibit dissimilar accumulations, but that the latitudinal range of the Sierra was not great enough for a north-south dichotomy. This research extends the data into the Oregon Cascades and shows that there is strong homogeneity in snowcover patterns throughout the two ranges. The first principal component represents the tendency for all snow courses to have uniform departures from normal, and accounts for over 60 percent of the variance. The second component indicates that one fifth of the variance is accounted for by a pattern in which the area south of about Mt. Lassen tends to have opposite accumulations of that to the north. Elevation does not exert a discernible impact on the pattern of departures from normal in this data set.

ORGANIZATIONAL AND REGIONAL ASPECTS OF ASYMMETRIES IN STRATEGIC ALLIANCES by Rowena Ahern Department of Geography DP-10, University of Washington, Seattle, Washington 98195.

Recently, there has been a significant increase in cooperation between corporations, even those which are competitors. Collaboration has implications for the alliance partners, and for the industries and regions in which they are influential. Asymmetries in the strength of alliance partners will allow some participants to assume dominant positions while others are compelled to accept dependent roles.

Like other forms of interaction between organizations, strategic alliances tend to be motivated by factors such as; gaining access to resources, coping with environmental constraints, and reducing risk and uncertainty. To gain the potential for such benefits, firms must commit assets which may not be redeployable. This paper provides a framework for examining the evolution of alliance relationships, in terms of the participants' strategic objectives for the alliance, and the resources they have dedicated to it.

The increasing trend toward interorganizational alliances, both nationally and internationally, has implications for the competitive position of firms and regions. Although corporate interests do not necessarily correspond to regional interests, an understanding of the processes that underlie the relative strength of alliance partners will contribute to more effective decision making at both levels.

THE AMERICAN WILDERNESS: AN ENDANGERED SPECIES? by Gretchen Ahlrichs, University of Texas, Austin, Texas 78712.

The Alpine Lakes Wilderness in Washington has recently implemented a mandatory permit system for the Enchantment Lakes Basin. It was considered as a last resort to stem the large flow of people into the area in order to maintain a wilderness experience and to curb the degradation of the once pristine mountain environment. In addition to having a permit, visitors must also comply with previous restrictions as no campfires or dogs in the basin and no more than 12 people in a group. This paper will examine the problems facing wilderness and the wilderness user due to heavy visitor use. Some of the problems to be addressed include the loss of plant and animal diveristy, loss of a wilderness experience, and loss of a natural state environment for use as a research base.

THE 1987-88 DROUGHT IN THE UPPER MIDWEST STATES: THE DIMENSION OF PRECIPITATION DEFICIENCY by Rafique Ahmed, Department of Geography, University of Wisconsin-La Crosse, La Crosse, Wisconsin 54601.

The drought of 1987-88 severely affected the upper midwest states, namely Iowa, Minnesota and Wisconsin, resulting in extensive damages to crops and livestocks. The climatological dimension of precipitation deficiency of this drought stricken area has been presented in this paper. Statistical analyses were performed on monthly precipitation data of the crop year (September through August) of 58 stations, scattered over the study area, for 24 years for the period 1964-65 through 1987-88. Spatial distribution of the mean (normal) annual precipitation; precipitation totals of the 1987-88 crop year; and the amount of deviation, percentage deviation and standardized deviation of the 1987-88 precipitation from the calculated normal precipitation have been mapped and discussed in the paper.

It appears that almost the whole study area received far below-normal precipitation during the 1987-88 crop year except a narrow strip that stretches from Detroit Lakes in the west-central Minnesota to Winton area in the northeastern Minnesota. The drought was severe in the area extending from east-central Minnesota and adjoining areas of Wisconsin to south-central Iowa, where precipitation deficiency was greater than two standard deviation below normal. The extreme south-central Iowa is the worst affected area, which received precipitation three standard deviation below the normal amount during the 1987-88 crop year, which is an extreme event that may occur once in two hundred years or so.

RESOURCE-BASED INDUSTRIALIZATION STRATEGIES: THE CASE OF INALUM IN NORTH SUMATRA, INDONESIA by Christopher A. Airriess, Department of Geography, Ball State University, Muncie, IN 47306.

In 1983, Southeast Asia's only aluminum smelter commenced operation in the province of North Sumatra, Indonesia. As a joint venture between a private Japanese consortium and the Indonesian government, the port-industrial complex of INALUM serves the economic interests of both countries. Japan lacks the energy resources, with which Indonesia is well endowed, to process alumina ore into aluminum ingots needed as inputs for high technology manufacturing. For Indonesia, the benefits are twofold. First, resource-based industrialization is viewed as an alternative industrialization policy to replace that of import substitution. Second, exploitation of outer island resources as a base for the development of industrial growth poles fits well into the newly emerging national development strategy to disperse the location of industries to the periphery and away from Java.

While the benefits of INALUM to the regional economic growth of North Sumatra are in principle promising, results thus far have been disapointing. The lack of both domestic backward and forward linkages are primarily due to structural constraints posed by both the regional and national economies. Especially important is the lack of available domestic capital, low regional demand and marketing costs. After exploring some technological, economic and locational circumstances engendering the establishment of INALUM, specific arguments are offered as to why this project remains a port-industrial enclave utilizing capital intensive, economies of scale technologies producing few spread effects within a labor intensive, agricultural hinterland.

A TRANSACTIONAL GEOGRAPHY OF THE IMAGE EVENT by Stuart C. Aitken, Department of Geography, San Diego State University, San Diego, CA 92182.

The success of a filmmaker is usually based upon her or his unique insights into how people perceive and respond to situations and settings. This is not to suggest that films work simply or primarily because their makers understand the conventions for representing behavior in the environment. On the contrary, the impact of an image event often relies on violating everyday expectations and thereby heightening the involvement of the audience with the film. Portrayal of unusual imbalances and unique transformations between people and environments constitutes an important component of good cinema.

This paper explores a framework for understanding the person-environment meaning embodied in the image event in cinema. The framework comprises three interdependent perspectives: (i) Linguistic's semiotic approach provides concrete structure for studying the symbolic meaning of environmental portrayal, (ii) nonverbal communication emphasizes the meta-communicative function of cinema, and (iii) recent developments in transactional theory suggest ways that geographers can direct their effort to systematically organize and understand the dynamics of person-environment relations. This conceptual structure is used to study Bill Forsyth's ethno-geographic portrayal of Scottish culture.

MAPPING UNIT DEFINITION AND REGIONAL CONCEPTS IN EARLY MODERN TOPOGRAPHIC ATLASES by James R. Akerman, The Newberry Library, 60 W. Walton St., Chicago, IL 60610.

The fundamental building blocks of topographic atlases are their mapping units, the territories covered by individual mapsheets. These may be classed into three types. Regional mapping units are individual territories with commonly understood identities and spatial extents. Cellular mapsheets, in contrast, are sections of larger regional maps that have been adapted to atlas format. Such mapsheets have uniform scales, sizes, and shapes, and are useful where comprehensive, balanced coverage is desirable. Hybrid mapsheets combine regions on a single map in such a way that minimizes variation in scale among mapsheets while preserving some measure of regional intelligibility.

All three types of mapping unit were employed by atlas-makers as early as the sixteenth century, though a survey of 50 large-format atlases in The Newberry Library published between 1570-1800 indicates that the majority of atlas mapsheets up to about 1650 were regional, owing to the early dependence of atlas publishers on pre-existing manuscript or printed maps which were most easily copied as regional mapsheets. For the treatment of Europe, this had the effect of putting even the smallest provinces on the same apparent footing as large countries. However, as a better topographic base was developed under the guidance and support of the emerging national-territorial states, cellular and hybrid coverage became viable alternatives. As a result, the separate identity of European provinces was symbolically diminished in many later atlases, and the nation-state became the fundamental means of organizing the regional geography of Europe in atlases.

CULTURAL AND HISTORIC VERNACULAR LANDSCAPES IN THE AMERICAN NATIONAL PARK SERVICE SYSTEM by Arnold R. Alanen, University of Wisconsin, Madison, WI 53706

One of the primary functions of the U. S. National Park Service is to protect and manage natural areas situated within its vast domain. The Park Service also is responsible for preserving thousands of archaeological remains, and in 1930 the organization began to manage and interpret the first of its historic properties. Today, the inventory in this latter category includes more than 13,000 historic structures and 26 million objects.

It is only recently that specific consideration began to be given to cultural landscapes found within the boundaries of many Park Service holdings. Five general categories of cultural landscapes are now included among the most recent definitions utilized by the Park Service: historic scenes, historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.

The purpose of this presentation is to evaluate the philosophical basis for cultural and historic vernacular landscape considerations in the Park Service, and to focus upon specific applications at three distinctively different properties: Cumberland Island National Seashore (Georgia), Apostle Islands National Lakeshore (Wisconsin), and Ebey's Landing National Historic Reserve (Washington). The assessment reveals that the studies of landscape geographers play an important role in providing criteria for evaluating and determining which Park Service sites will be managed as historic vernacular landscapes.

GIS AND A GEOGRAPHIC CLASSIC REVISITED: MAN'S ROLE IN CHANGING THE FACE OF THE EARTH by R. H. Alexander, U.S. Geological Survey, Denver, Colorado 80225.

Themes from Man's Role in Changing the Face of the Earth are examined in the light of the potential applications of today's geographic information systems (GIS) and how those systems might influence work that follows in the footsteps of the classic 1956 volume a third of a century later.

Greatly oversimplified, the three principal themes treated in Man's Role, and in the 1955 Symposium on which the volume was based, are Retrospect -- assessment of the record of the past; Process -- anthropogenic and environmental processes and their consequences for life on earth; and Prospect -- what the future might hold, the unstable equilibrium of man in nature, and the implied responsibilities of humans as planetary managers.

Selected examples are used to illustrate how studies of each of the three principal themes might be aided by GIS technology. Under Retrospect, the capture and manipulation of digital spatial data on regional land surface change are compared with the earlier descriptive methodologies. Under Process, GIS applications to ecosystem disturbance and natural hazards are examined. Finally, speculations on how GIS may help us to visualize alternative futures -- through geographic forecasting and simulation of possible regional and global outcomes of present trends -- are compared with the visionary insights of Prospect. The philosophy of Man's Role and the potentials of GIS are shown to be important components of global change research.

THE URGENT NEED FOR GEOGRAPHICAL INFORMATION SYSTEMS FOR THIRD WORLD DEVELOPING ENVIRONMENT: SULTANATE OF OMAN EXPERIENCE by Mohammed Ali, Sultan Qaboos University, P. O. Box 32482 Al-Khod, Muscat, Oman.

Development planning in Third World countries is frequently characterized by incomplete consideration of the relevant spatial data. In most cases, the developmental processes are bound by the availability of spatial information and its methods of organization. Oman is no exception to this: it is a young, developing country that is just beginning to accumulate data in significant quantities and develop procedures for managing this information. Despite these efforts, several gaps are found to be hampering the efficiency of development projects. Among these are inadequate data collection processes. Often reliable geographical data in the form of cartographic products, aerial photographs or remotely sensed images are non-existent, unavailable , or of poor quality. The data coding is unstandardized. There is also a great deal of misflow of information between control systems and real world information. Furthermore, the operation of the information system is complicated by four factors: a lack of modern computerized systems to handle the information; inefficient or cumbersome manual methodologies; misunderstanding of the legitimate contributions of automated mapping and GIS technology to planning and decision making; and finally by the lack of historical depth of the data itself. The end result of the above constraints is that the geographical analysis of development problems is often overlooked or ignored.

To address these apparent deficiencies in Oman's development planning processes, projects and programs, this paper attempts to lay the ground for establishing a sound geographical Information System. More specifically the paper proposes the enhancement and promotion of automated Geographical information techniques for the analysis and display of spatial data.

CAPITAL INVESTED IN THE GEORGIA URBAN MANUFACTURING SECTOR, 1860-1880: WHAT MY MOTHER NEVER TOLD ME by Daniel S. Allen, University of Georgia, Athens, Georgia 30602.

Recent economic and geographic studies raise questions concerning the appropriateness of traditional southern urban and economic development models, especially those concerning the lack of an urban manufacturing sector during the antebellum and Reconstruction periods. This paper uses capital invested data contained in the published manufacturing census to construct a series of proportional circle maps for 1860-1880 Georgia cities. These maps demonstrate that urban manufacturing was established before the Civil War and experienced net growth throughout the study period. This increase in urban manufacturing investment, coming as it does during a supposed period of urban stagnation or decline, contradicts traditional southern urban and economic models.

THE REGIONALIZATION OF SERVICES : GROWTH AND POLARIZATION IN THE SOUTH EAST OF ENGLAND by J. Allen, Faculty of Social Sciences, The Open University, Milton Keynes, MK7 6AA, UK

In an attempt to understand uneven economic development, geographers are increasingly turning their attention to the expansion of the service industries. In the UK, the majority of recent service growth has occurred in the southern half of the country, especially in the south east region. As the growth region of the UK, and the site of the capital city, London, some of the major processes of change are being produced and reproduced in the south east. Two of these processes are addressed directly in the paper : the globalization of services and the privatization of services. It is argued that in recent years a polarization of urban labour markets in the south east has taken place; a phenomenon not dissimilar to many of the largest US cities. More importantly, it is argued that such polarization is not only a product of service sector growth, that is, the expansion of certain service industries with specific sets of skills, wage levels and conditions of work; it is also the result of a particular kind of growth in the south east.

As an international enclave, London and the south east are locked into the global economy in ways that are significantly different from any other UK region. The paper explores this difference and concludes that the past and present roles of the south east region sets it apart as an emergent global service region - a leading edge of uneven redevelopment.

USING SATELLITE DATA TO ESTIMATE SOLAR IRRADIANCE by Ted J. Alsop, Department of Geography, Utah State University, Logan, Utah 84322-5240

This paper assesses the performance of two statistical models designed for estimating solar irradiance using satellite data. After subjecting GOES data to the Hay and Hanson (1978) and Tarpley (1979) models, calculated solar irradiance values are compared to actual ground-based pyranometer measurements acquired in the Utah Solar Irradiance Network. An evaluation of each model is presented as well as a discussion of factors needed to improve their use in a mountainous region.

THE YELLOWSTONE FIRE ONE YEAR LATER--RESEARCH IN REMOTE SENSING ANALYSIS by V. Ambrosia, ATAC, Inc. NASA-Ames Research Center, Moffett Field, Ca. 94035, J. Brass, NASA-Ames Research Center, Moffett Field, Ca., R. Lathrop, Rutgers University, N.J., K. Hibbard, TGS Technology Inc., NASA-Ames, Ca. 94035, P. Riggan, USDA-Forest Service, Riverside, Cal.

During the summer and fall of 1988 severe wildfires altered the biologic community of the Greater Yellowstone ecosystem. During and following those events, NASA mobilized a research and response team to study the effects of fire on vegetation community development, while also utilizing the activity and data to derive a more comprehensive understanding of the relationships between remote sensing spectral information and fire behavior, short-term post-fire ecosystem response, and long term alterations.

After one year of research and data collected from airborne and space-borne platforms, and coincident ground data collection efforts, some interesting preliminary results can be discussed. These discussions will include the potential for thermal analysis of active fire characterizations, post-fire damage assessment, vegetation response during the following spring and summer, and alterations to surficial stream and lake nutrient and sediment loads.

ESSENTIAL ENVIRONMENTAL AND SPATIAL CONCERNS FOR THE VISUALLY IMPAIRED by D. Amedeo, University of Nebraska and K. Speicher, University of Nebraska.

Individuals enact behavior and undergo experience in and with reference to environments. Hence, environments are inextricably tied into the definition of both, and both, in turn, are integral to what becomes "known" as the environment. This mutual indispensability makes the process of perceiving environments critical for the enactment of behavior and the undergoing of experience, particularly because information about arena and context is needed in order to assess appropriateness of behavior, to maintain continuity of action and perception itself, to facilitate navigation and orientation, and to enhance social communication. This human "knowing" process requires sensing and processing capabilities for the acquisition and evaluation of information, and the visual faculty is one of its most important receptors. In this paper, we discuss those essential environment-as-context and spatial-as-arena concerns faced by those visually impaired since birth. Person-environment-behavior paradigms are examined for implications they may have on the contextual concerns associated with the behavior and experience of the visually impaired. The ways in which the absence of capability in the visual receptor might lead to problems in spatial-arena-functioning aspects of behavior and experience are also contemplated. Finally, potential concerns for the visually impaired associated with effective space-use as a means to enhance and support other behavior, expectations, and norms are discussed.

EMIGRATION, REMITTANCES, AND THE ECONOMIC CONSEQUENCES ON TWO LEBANESE VILLAGES by Hussein A. Amery, McMaster University, Geography Department, Hamilton, ON L8S 4K1.

This paper presents preliminary findings of my research on the effects of emigration on the economies of two neighboring villages in south east Lebanon, one Christian, the other Muslim. The data are based on questionnaire surveys of 210 households carried out in the summer of 1989.

Although the rate of emigration from both villages is high, the destination choice of the migrants and their propensity to remit vary greatly. On the one hand, the Christian village, Khirbat Kanafar, has been devitalized from the emigration of its skilled labor force, and the absence of remittances and investments. On the other hand, the Muslim village, Lala, is reaping the fruits of returning migrants, and a heavy flow of remittances. So, while Khirbat's residual villagers now rely almost solely on agriculture, Lala's are growing more dependent on remittances, inducing residents to early retirement, and hastening their abandonment of arable land and terraced fields.

The findings of this study should assist in the efforts to construct a useful theoretical framework from the existing scattered literature on remittances and development. Each village's religious composition and geographic location, when analyzed in the context of Lebanon's sectarian civil war, affect migrants' desires to emigrate, remit or return to their villages. Hence, the economic development of rural Lebanon varies spatially.

Uses of Desktop Publishing Applications in Historical Cartography: 20th Century Technology and a 12th Century Map: by Robert Amey, 3141 Turlington Hall, Department of Geography, University of Florida, Gainesville, FL, 32611; and Ralph Brauer, The Institute for Research on the Interrelation of Science and Culture, 1601 Doctor's Circle, Wilmington, NC, 28401.

A microcomputer–based cartographic effort to re–create historical documents has both benefits and liabilities, some expected, some not. One must honor the document's sense of time; other problems are unique to a specific document. One such challenge for the cartographer and the translator is al Sharif al'Idrisi's geography *The Book of Roger* : a 30" by 66" map in seventy sections with approximately 5000 place names, physical features, area designations and descriptive comments, supplemented with an 1100 page text in English translation. This discussion focuses on the preservation of the map's historical significance in a modern language and modern cartographic format in context to the map–text complementarity.

Al'Idrisi pointedly comments in the preface about the text's supplemental role, and he credits to Roger II the desire to eliminate the graphic and literary errors handed down from the well–respected Greek and Islamic scientists. *The Book of Roger* is a detailed description of the world as it was known to the Arabs and Normans, completed in 1154 A.D. during the decline of the Islamic Renaissance and after the first of the Christian Crusades.

FOOD CRISES IN AFRICA: IMPLICATIONS FOR RURAL DEVELOPEMT by Felix Ayikwei Ammah-Tagoe, Department of Geography, Boston University, 675 Commonwealth Ave., Boston, MA 02215.

Although in the last few years famine in some African states including Ethiopia, Chad, and the Sudan has attracted world wide attention, there are vast numbers of people in Africa whose diet is inadequate to maintain good health. All these people are undernourished. Despite the fact that this form of hidden food crises does not capture world attention, its social and economic cost are far greater than famine. This paper looks at the food crises in Africa within the context of rural development and examines the contradictions that exists in the theory and practice of rural development in Africa. It presents evidence about Africa's decreasing agricultural growth rate, stagnated exports and decline in Africa's share in world trade, increased commercial grain imports and increased food aid. It adopts the theoretical view that the process of transforming the rural areas cannot be dissociated from national development.

LOCATIONS OF INDIAN ROCK ART IN CHACO CANYON, NEW MEXICO by D. Anderson, University of Tennessee at Chattanooga, Chattanooga, Tennessee 37403 and N. Honerkamp, University of Tennessee at Chattanooga, Tennessee 37403

Little is known of the meanings of much of the various drawings pecked or painted on stone by the early Indians of the American Southwest. However, the literature suggests that in many cases rock art sites served specific functions. This study is concerned with whether any relationships exist among drawings found in close proximity to each other in a part of Chaco Canyon, New Mexico. Are the images in the drawings or panels independent, or are they spatially related? An exhaustive survey of all rock art found on the north wall of Chaco Canyon near the canyon floor and along a one kilometer path running east of Casa Chiquita was conducted in June of 1989. For the purposes of analysis, the surveyed locations are considered to lie along a straight line. Thus, simple statistical tests are applicable. While some non-random groupings are suspected, the results of the tests used are insufficient to reject the null hypothesis that rock art locations are random.

THE CBC: AN INSTITUTIONAL GEOGRAPHY by Eric Anderson, University of Minnesota, Minneapolis, MN 55455.

Like the railroad system from which it was born, the Canadian Broadcasting Corporation has been a tool for holding together the diverse parts of the Canadian nation. Spatial disparities in the development of the CBC radio and television networks reflect changing federal views of the importance of various regions. The spatial diffusion of CBC stations reflects not only the stresses of east-west relationships within the country, but also north-south tensions created by the more rapid growth of broadcasting power in the United States.

PROBLEMS WITH TOURISM DEVELOPMENT IN CANADA'S EASTERN ARCTIC by Malcolm J. Anderson, Dept. of Geography, Queen's University, Kingston, Ontario, Canada K7L 3N6.

This paper looks at tourism in a peripheral tourist destination and details the problems and policies presently facing tourism development in such an area. Canada's eastern arctic (Baffin Region Travel Zone)is used as the focus of this case study approach. It is argued that while 'developmental' change has taken place and more tourists now visit the Baffin region, the policies and strategies used and problems presently faced inhibit the very nature of community based tourism.

Following an introduction to tourism in Canada's Northwest Territories and the Baffin region in particular, the specific issues presently facing the region are detailed in terms of the problems encountered and the strategies implemented to remedy these. It becomes apparent that the strategies used do not a) consider the specifics of the Baffin region or b) conform with the conclusions made in tourism research generally. Thus a reevaluation of tourism development in the area is required. The concluding section of the paper offers an approach which places greater emphasis on the spatial practicalities of the region and promotes regional autonomy for the Baffin Travel Zone.

HOLOCENE HISTORY OF ALASKAN BOREAL FOREST: EDAPHIC AND CLIMATIC FACTORS by Patricia M. Anderson, Quaternary Research Center University of Washington, Seattle, WA 98195

Pollen records from northern Alaska indicate that *Picea glauca* spread rapidly from the Canadian border to the south-central Brooks Range ca. 9000 BP and then declined ca. 8000-7000 BP. *P. mariana* was absent in Alaska until ca. 6000 BP when its populations expanded across much of northern Alaska. This history may reflect the individualistic response of *Picea* species to regional climate and/or the importance of edaphic changes in controlling *Picea* populations. Pollen data indicate a shift to cooler, wetter conditions between 8000-6000 BP. Computer simulations of paleoclimates do not show a cooling until ca. 3000 BP indicating either a substantial Holocene vegetation change that was independent of climate or Holocene model results are in error. Today, rising permafrost and its affects on soil temperature, water and nutrients are primary factors causing successional changes from *P. glauca* to *P. mariana* forests. The buildup of slowly decomposing conifer litter in *P. glauca* stands insulates soil surfaces from summer heat thereby causing a rise in permafrost. Paludification caused by permafrost aggradation eventually eliminates *P. glauca* and allows the development of *P. mariana* muskeg on the cool, moist soils. These changes reflect a normal successional cycle and are independent of climate change. Such changes are small-scale and not normally associated with regional vegetation change.

COMPARISON OF CHANGES IN TWO GREAT POWER DOMINATED REGIONS: LATIN AMERICA AND EAST EUROPE by Thomas D. Anderson, Department of Geography, Bowling Green State University, Bowling Green, Ohio 43403.

The United States and the Soviet Union long have exerted hegemony in Latin America and East Europe respectively. Over the past decade both regions have experienced important economic and political changes. These changes in domestic conditions were induced in part by great power policies and in turn have helped to alter geopolitical relationships. Following a brief review of the broad features of each region the paper focuses upon external debt and its effects on national economies, and upon the patterns of increased personal freedoms and political pluralism. Most countries in both regions have incurred massive debts with the West, whereas heavy debt to the Soviet Union is limited to East Europe except for Cuba and Nicaragua. In both regions governments increasingly have adopted market-type economic measures in an effort to cope with the debt burdens. Political repression has eased far more greatly in Latin America but there is considerable progress also in East Europe. In Latin America right-wing military dictatorships remain only in Chile, Panama, and Paraguay, whereas in East Europe Leninist regimes have moderated controls greatly only in Hungary, Poland, and Yugoslavia. These changes are attributed to calculated diplomatic initiatives by the United States, broad trends in the world economy, and the demonstrated deficiencies of the Soviet economic and political model.

SETTLEMENT PATTERNS AND CHAIN MIGRATION: EVIDENCE OF CULTURAL TRANSFER IN A MISSOURI GERMAN COMMUNITY, 1837-1981 by Timothy G. Anderson, Texas A&M University, College Station, Texas 77843

Westphalia, Missouri, was initially settled between 1835 and 1837 by German immigrants disillusioned by adverse social and economic conditions in their homeland. Close examination of the cultural landscape of the area reveals several manifestations of the first settlers' ethnicity. Perhaps the most notable is the way in which the town is planned. Laid out a long, low ridge, the village proper is over one mile in length and only a few blocks wide, contrasting with the rectangular grid survey upon which old-stock American settlements nearby were planned.

Using census data and other primary sources, evidence is presented that supports the notion that chain migration from a small geographical area in the source region played a strong role in the settlement of the community. In addition, historical maps and plats are employed in a discussion which attempts to classify the linear settlement pattern, historically accompanied by long-lots, and explain its origins. Finally, the role of these two processes in shaping the cultural landscape of the community is discussed.

THE OTHER JET-SET BY Valerie Anderson, California State University at Sacramento, Sacramento, CA.

The large Chinese population of Malaysia migrated during the 1880-1933 period. The men came as single sojourners, often to work in the tin mines and stayed to become market gardeners, hawkers, shop keepers and family-men. Most of the women came later, during the 1930's, to earn their living and/or to marry.

These Chinese families struggled and survived the Japanese occupation during WWII, Emergency Rule in response to the Communist threat, resettlement in New Villages (and the loss of homes and gardens), Independence and citizenship, and a New Economic Policy that often favors another ethnic group in economic and educational matters.

Now, thousands of Malaysian Chinese are working abroad, legally and illegally; many are attempting to migrate to Western democracies. Husbands/wives, sons/daughters, migrate, send money home, return to Malaysia, or remain abroad.

This work is part of a larger study of the economic strategies and available housing resources of low-income Chinese families in Ipoh, Perak, Malaysia. I have interviewed grandmothers, mothers, daughters and grandaughters in an attempt to describe the considerable productive and reproductive contribution of these women. This paper describes one family strategy, migration and contributes one more example to the current work on migration that reveals a massive and continuous flow of mid and low-income persons flying around the world seeking expanded opportunities.

AN "IDEAL" MODEL FOR HANDLING DEVELOPMENT SITUATIONS IN MARGNAL AREAS by Lennart Andersson, University of Karlstad, Box 9501, S-650 09 Karlstad, Sweden

Some aspects of the development process in marginal area are considered in empirical and theoretical terms.

Three critical events have been identified in the process of implementing intentions from "above" in a local territory. The first and perhaps most influential of these is termed the "collision" and refers to the crucial moment when intentions from above meet the intentions of the local territory. In too many important cases throughout the world the result has been the unexpected deformation of the original intentions and the emergence of problems.

The research reported on here focuses on "collision" issues. The purpose is to describe and analyse some actual collision situations, relating experiences gained from them to theoretical considerations. The latter include findings in implementation analysis in political science and in the fields of the geography of the local territory - "locology" - and the geography of creativity.

In implementation research it is the various aspects of the bottom-up model that are of particular interest. Locology and the geography of creativity are important for understanding the connection with space, the critical forces in the local mobilization process and the ever present competition between neighbouring regions. These forces play a major role in determining the result of the "collision".

Finally, a model - an "ideal" model - for dealing with "collision" situations and problems is outlined.

DEVELOPMENT IN A MOUNTAIN COUNTY by Alice Andrews, George Mason University, Fairfax, VA 22030.

This study describes recent trends in development in a mountain county. Although Appalachia continues to be perceived as a region of poverty, stagnation, and isolation, the stereotype does not apply to Union County in the Blue Ridge of northern Georgia. The recent completion of the Appalachian Highway, specifically designed to promote development and relieve isolation, is already having a positive effect on the county's economy. Over the past fifty years, the county has gone through stages of development comparable to those experienced by developing countries today. Isolation has steadily decreased, and the economic base of the county has shifted from almost total dependence on agriculture to manufacturing and services, with an emphasis on tourism. The manufacturing sector is geographically of interest; it consists of a number of small plants and enterprises dispersed throughout the county. They are based on the production of apparel or are agriculture-related.

Indicators of social well-being reveal that although the county is relatively poor in terms of per capita wealth, it is remarkably well off in terms of health, education, and social services. The population is quite homogeneous. The county is growing in excess of projections, largely due to in-migration of older people, chiefly from Florida. New subdivisions have proliferated throughout the county, especially around Lake Nottely, one of the smaller TVA reservoirs.

COMPREHENSION AND USE OF MAPPED INFORMATION BY VISUALLY IMPAIRED CHILDREN by Sona Karentz Andrews, Department of Geography, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53211.

Maps are useful tools for structuring and organizing space and it has been demonstrated that maps can play a significant role in the acquisition of geographic knowledge. This paper presents the results of a study conducted to determine some of the cognitive and cartographic elements of map use by visually impaired elementary and secondary school aged children. The cognitive issues focus on the abilities of visually impaired children to read, comprehend, and integrate tactual mapped information via a sample social science curriculum. The cartographic issues deal with the technical design and presentation of the mapped information. Visually impaired students who are mainstreamed in public schools and students from a state school for the blind are the participants in a series of instructional exercises aimed at examining these cognitive and cartographic topics. Comparisons are made between these findings and what we know, or assume to know, about sighted children's map use abilities and psychological theories regarding children's acquisition of spatial and geographic knowledge.

PRODUCTION, LABOR MARKETS, AND LOCATION: THE US SEMICONDUCTOR INDUSTRY by D. Angel, Graduate School of Geography, Clark University, Worcester, Massachusetts 01610.

Over the past decade a definite form of flexible manufacturing has emerged in the US semiconductor industry, comprising a localized complex of small vertically disintegrated firms clustered together in Silicon Valley. The majority of these firms are engaged in non-routinized manufacturing activities (such as circuit design) and in low volume and fast turnaround production for specialized market niches. My paper examines the structure of employment relations and labor market activity characteristic of this segment of the semiconductor industry, using original data collected in a mail questionnaire survey of firms and workers. The analysis reveals a pattern of fluid employment relations, high levels of inter-firm worker mobility, and intensive hiring activity within the Silicon Valley local labor market. This structure of labor market activity is shown to be an important dimension of the manufacturing flexibility and technological dynamism characteristic of these specialized semiconductor firms.

NOOSPHERE AND GLOBAL CHANGE by Vladimir V. Annenkov, Institute of Geography, USSR Academy of Sciences.

Can we conceive of an Earth envelope, where life, humans, and material culture coexist as one system, integrated by various life supporting processes? The geochemist V.I. Vernadsky named this envelope "Biosphere" and focused attention on its transformation through human impact to a new state of Noosphere. This paper presents an evolutionary view of the Noosphere maturing in relation to trends including expansion of anthropogenic landscapes, alteration of biospheric cycles, and management of human impact on the Earth System. The genesis of the Noosphere has become the subject of a new field in Historical Geography that attempts to reveal the spatial organization of human actions and environmental changes during the last millennia, centuries, and decades. This field contributes to the understanding of human responsibility for global change in our common home - the Biosphere.

PROBLEMS OF GENDER, CLASS, AND REGIONAL INEQUALITIES IN GHANA: A RESEARCH METHODOLOGY by Cherub Antwi-Nsiah, Department of Geography, University of Illinois, 220 Davenport Hall, 607 South Mathews, Urbana, Illinois 61801.

This paper presents a methodology for examining the nature of the problem of gender, class, and regional inequality in Ghana. The research specifically addresses these issues: differences in activity patterns; access to and control of property, rights to resources and the dimensions across which they vary; the indirect mechanisms generating and reinforcing these inequalities; and the extent to which gender, class, and region influence perceptions of status in society and assessment of life chances.

The research is based on a field survey of households in Ghana stratified by gender, class, region, and by socio-cultural group. The first part of the survey focuses on household composition and mobility; intra-household dynamics relating to decision making; division of labor; and sources of income, resource control, and the principal means of resource distribution. The second part is a pair-wise comparison of groups along along the society's attributes of status and "well-being". The final part of the survey on enrollment and attendance in schools, examines gender differences in educational participation.

The study concludes that relative to males, females do not command the resources and rights for carrying out their activities and do not enjoy the benefits of their labor; household activities act as a constraint to female participation in education, especially females from lower class households who reside in rural communities; and that class and regional inequalities reinforce gender inequalities.

LATE-QUATERNARY STRATIGRAPHY IN THE NORTH FORK SOLOMON RIVER VALLEY OF NORTHCENTRAL KANSAS by Alan F. Arbogast, Department of Geography, University of Kansas, Lawrence, Kansas 66045

Recent mapping of surface geology in northcentral Kansas reveals a complex late-Quaternary stratigraphy of loess on the uplands and alluvium in the valley of the North Fork Solomon River. Loess units have tentatively been dated as Farmdalian (Gilman-Canyon Formation), late-Wisconsinan (Peoria loess), and Holocene (Bignell loess) in age. An extensive high terrace (Kirwin terrace) dominates the valley floor. The associated fill consists of sands and gravels derived from local Tertiary (Ogallala Formation) and Upper Cretaceous (Smoky Hill Chalk member of the Niobrara Formation) bedrock which is in turn overlain by fluvial silts and clays and occasional reworked loess. Loess deposits also exist on the Kirwin terrace. Radiocarbon ages on soil humates indicate that most deposition on the Kirwin terrace ceased during the late Holocene following stream entrenchment. The modern floodplain is mantled in most places by sands and gravels derived from the Ogallala and Smoky Hill Chalk Formations. Extensive sand dune fields occupy the inside of meander bends along the study reach. The dunes appear to be reworked point bar deposits which have been altered by fluvial and eolian processes. High and low energy flood events are apparent in the array of alternating layers of sand and thick silt in the lower portion of the dune profile. Cross-bedded sands and blowouts in the upper dune profile indicate an eolian component which remains active.

TIME, SCALE, AND THE SPATIAL VARIABILITY OF FEDERAL OUTLAYS by J. Clark Archer, Department of Geography, University of Nebraska, Lincoln, Nebraska 68588-0135, and Paul H. Kramer, Computing Resource Center, University of Nebraska, Lincoln, Nebraska 68588-0496.

The Constitution does not require geographical uniformity of federal outlays. Yet few members of Congress seek reduced spending in their own district or state, so the size, composition, and geographical distribution of Federal outlays are interwoven issues.

A tendency for state-to-state variability in federal outlays to diminish over time has been observed previously. The state-level Coefficient of Variation for total federal outlays per capita declined from 0.394 in FY1963 to 0.238 in 1982. A still lower value of 0.196 has been found for FY1986. Exploratory computations, however, indicate less uniformity at finer geographical scale, as shown by a county-level coefficient of 0.862 for FY1986 total federal outlays per capita. Moreover, county-level coefficients ranged from below 0.300 to over 5.000 for different categories of federal expenditure during FY1986.

Cartographic and statistical analyses help to differentiate those types of outlays which tend toward geographical uniformity from those which tend toward geographical localization. Such analyses also help to shed light on the provocative issue of whether the total is more geographically uniform than the parts.

THE GEOGRAPHY OF BEOWULF: FACT OR FICTION? by Andrea Voorhees Arlinghaus, M.A., Ph.D. Precandidate and Jacob K. Javits Fellow, Department of English, The University of Michigan, 2730 Windwood Drive #148, Ann Arbor, Michigan 48105. Co-sponsored by IMaGe.

Beowulf describes a period of relations between two Germanic peoples: the Geats and the Danes. References are also made to the Swedes. In addition to these broad references to clans or tribes (each of which occupied a relatively large geographic area), the poem includes more specific references to local physical features such as bluffs and waterways. Are these references to actual historical figures and locations, or are they products of a poet's imagination? Perhaps more likely, are they the result of poetic synthesis of the two? While certain historical documents refer to characters in Beowulf, these accounts often contradict the chronology or plot of the poem. Other available evidence suggests an intriguing mix of fact and fantasy in the geography of the poem as well as in its characterizations. This poster will present a probable map of the political boundaries and sites of action described in the poem as compared with the boundaries and terrain thought to have been present during that period. This map will be based upon theories regarding much-debated issues such as the date and location of composition of the poem, the applicability of evidence from other historical and literary texts, and the relevance of archaeological finds.

CENTRAL PLACE FRACTALS by Sandra Lach Arlinghaus, Institute of Mathematical Geography, 2790 Briarcliff, Ann Arbor, MI 48105-1429.

The purpose of this paper is to show how central place hierarchies can be generated using concepts from fractal geometry. A single, suitably chosen and scaled, fractal generator produces the entire hierarchy. One result of this geometric method is that yet another (in addition to Lōschian numbers) numerical invariant emerges to characterise a property of an entire hierarchy—the fractal dimension measures the space-filling characteristics of the lines of the superimposed layers of hexagonal nets. It is the purpose, as well, to show how to select a generator suited to producing an arbitrarily chosen hierarchy. The methods involved in this selection are based on concepts from synthetic geometry and from number theory. They permit the complete determination of the size, shape, and symmetry of a suitable generator solely on the number-theoretic characteristics of the K-value and of values derived from quadratic forms associated with the underlying (equilateral) triangular lattice. A sequence of theorems provides this complete theoretical characterisation of central place geometry. Thus, results and conclusions are presented as theory. A brief overview of the results and of selected references will be available as handouts, as will selected related reprints.

SUM GRAPHS IN GEOGRAPHY. Sandra L. Arlinghaus, Institute of Mathematical Geography, 2790 Briarcliff, Ann Arbor, MI 48105; William C. Arlinghaus, Department of Mathematics and Computer Science, Lawrence Technological University, Southfield, MI 48075; and, Frank Harary, Department of Computer Science, New Mexico State University, Las Cruces, NM 88003.

A "sum graph" is a new graph-theoretic concept (introduced in 1988 by Harary) which is forced by the algebraic rule of edge-assignment to have at least one isolated node. When number theory is used on sum graphs, it is possible to characterize a graph-theoretic path in terms of the Fibonacci sequence. We examine geographic application of this mathematical concept, focusing on the notion of node-isolation: the isolated node will be viewed as a node with invisible edges in order to suggest a systematic method for shifting scale without disturbing associated spatial structure. A "sum graph unification theorem" for graph theoretic paths permits such shifts.

THE GLOBAL MOUTH: A GEO-PHONETIC MAP by Andrea Voorhees Arlinghaus, M.A., Ph.D. Precandidate and Jacob K. Javits Fellow, Department of English, The University of Michigan and William Edward Arlinghaus, B.A. (Theoretical Linguistics), both of 2730 Windwood Drive, #148, Ann Arbor, MI 48105. Co-sponsored by IMaGe.

The velum is the soft palate located near the back of the vocal tract. Velar sounds are produced in this region of the mouth; /k/ the initial sound in "Cartography," and /g/ the initial sound in "Gobi" are English examples. A familiar Germanic variation is the velar fricative, the final sound in "das Buch." Do regions of the mouth correspond to regions of the world? This poster maps phonetic regions of the world, according to established abstract linguistic characterization of vocal sounds, such as (in addition to velar sounds) post-alveolar clicks produced by the tongue in contact with the hard palate, dental clicks produced by the tongue in contact with the teeth, and lateral clicks. In the tradition of geographic exploration, we also consider human sounds which apparently are not yet known as part of human language. The presenters are competent to demonstrate all the sounds they map.

KNOWLEDGE CLASSIFICATION AND ORGANIZATION FOR CARTOGRAPHIC GENERALIZATION by Marc P. Armstrong, Departments of Geography and Computer Science, 316 Jessup Hall, University of Iowa, Iowa City, IA 52242

Three kinds of knowledge are described which must be organized and applied to effectively implement cartographic generalization processes: geometrical knowledge, structural knowledge, and procedural knowledge. Geometrical knowledge is used to describe characteristics of a feature at some large scale; structural knowledge is used to provide details about underlying generating processes that gave rise to the feature; and procedural knowledge is used to guide the application of appropriate algorithms that perform the generalization. A frame-based scheme is used to illustrate the representation of the knowledge base.

AN ANALYSIS OF THE ENERGY BUDGET FOR AN URBAN CANYON by A. John Arnfield, The Ohio State University, Columbus, Ohio 43210.

An analysis is presented for the energy budget of the air volume in a dry, urban canyon, emphasizing the relationship between the within-canyon temperature and flow fields and the advection and circulation heat flux terms. Measured data on longitudinal gradients of air temperature and wind speed from a deep, dry, east-west canyon in Columbus, Ohio, are used to evaluate likely magnitudes of the bulk heat flux through the canyon top brought about by a non-zero mean vertical velocity. The behavior of the circulation and turbulent sensible heat fluxes is described using measured temperature-vertical velocity covariance statistics for the same canyon. These are found to be generally small, uncorrelated with the canyon top net radiation and sometimes in opposite directions. The implications of such behavior are examined and some possible explanations, including the potential for measurement error, are proposed. The implied major role of the substrate heat flux in the energy budget of a canyon of the type studied is investigated using a combination of numerical modeling and temperature measurements. Finally, some speculations are offered regarding the significance of canyon asymmetry and height: width ratio for the energy exchange between the urban canopy and boundary layers.

TOURISM AND LOCAL DEVELOPMENT. UTILIZATION OF TIME, SPACE AND RESOURCES by Lars Aronsson. Department of Human and Economic Geography, School of Economics and Commercial Law, Gothenburg University. P.O.Box 3016, S-400 10 Goteborg, Sweden.

The study seeks to examine tourists' and residents' utilization of time-space and resources, and the general development of tourism in the resort. The aim is to discover whether encounters occur in time-space and whether these result in a reorganization of the residents' community and changes in their routines, in social conflicts or in competition for scarce resources. To achieve this, we shall first consider the tourist's total set of activities during his stay at the resort. Secondly, encounters will be studied from the perspective of the residents' activity patterns and resource utilization during the tourist season and during the rest of the year. Thirdly, we intend to make a general study of the development of tourism in the resort, including land, water and social resources. The area selected for study is the summer tourist municipality of Sotenas situated on the Swedish west-coast. There are two methods that are going to be used. A time-geographic method which gives a cross-section in time. The other one is a study over a longer period of time which gives a picture of the more general tendencies in the development of tourism in a municipality. The research project started in the autumn of 1989 and is planned to be finished in the autumn of 1991.

HOLOCENE ALLUVIAL CHRONOLOGIES FROM NORTH DAKOTA: IMPLICATIONS FOR THE TIMING OF MAJOR EPISODES OF REGIONAL GEOMORPHIC CHANGE by Joe Alan Artz, Highway Archeology Program, University of Iowa, Eastlawn Building, Iowa City, Iowa 52242.

A model set forth in 1976 by Lee Clayton and associates postulated that major episodes of eolian deposition and soil formation in the uplands of North Dakota should be regionally synchronous, and linked to climatic change. Subsequent stratigraphic studies and radiometric dating programs have confirmed the model's general predictions for the timing of geomorphic change. This paper seeks similar evidence for synchronous geomorphic responses in stream systems from this part of the northern Great Plains. Holocene alluvial chronologies are reviewed for five North Dakota study areas, arranged on an east-west transect across the state. The chronologies provide evidence for synchroneity, but asynchronous elements are also present. Knowledge of alluvial chronologies and fluvial geomorphic change in North Dakota remains sketchy. A major problem is that many studies have been too narrowly focused on the dating and interpretation of single study sites, a tendency that is somewhat inherent in the site-specific scope of the archeological projects within which most stratigraphic studies have been accomplished. A broader perspective is required to increase the understanding of the evolution of alluvial landscapes, and to link alluvial processes to causal mechanisms such as climate. This larger perspective requires viewing single sites as components within larger scale alluvial and eolian depositional systems.

BRAID BAR SEDIMENTATION IN GRAVEL-BED RIVERS by Peter Ashmore, Department of Geography, University of Western Ontario, London, Ontario, N6A 5C2

Gravel-bed braided river floodplain deposits are dominated by bed load calibre sediments deposited as large complex lateral and medial bars. Previous work has established that these large braid bars are formed by a sequence of sedimentary and erosional events which are unique to each bar, and may be quite different for two bars that are apparently similar. In some cases the complex bars can be seen to be the result of systematic accretion of smaller unit bars but often these are incorporated into the fabric of the bar and difficult to identify. Observation of the bar construction processes is difficult to accomplish in the field and therefore the sequence of development of a large complex braid bar developed in a Froude model of a gravel braided stream is described. The core of the bar may be developed as a result of either primary braiding or secondary anastamosis. The subsequent development includes a variety of processes such as lateral accretion of sheets and bars, dissection, infilling and abandonment channels, avulsion, and bank erosion. Thus, it is difficult to generalise about the details of braid bar structure and the nature of braided river floodplain sediments, and hence to erect models for the recognition of their deposits.

ACCESS TO GENERAL PRACTITIONER SERVICES: QUANTITY VS. QUALITY by Paul Askew.
Department of Town Planning, University of Wales College ofCardiff, PO Box 96, Cardiff, CF1 3YN, UNITED KINGDOM.

In the British health care system General Practitioners (GPs)perform two important roles. Firstly as the main providers of primary or community based medical services, and secondly as the çgatekeepers' to secondary or hospital based care. This importance has been recognised in the study of inequalitiesin accessibility to GP based primary health care. This paper considers physical accessibility to GPs in the county of Avon, comparing a number of accessibility measures, extending measures based on the quantity of service provision, such as the number of GPs, to more complex notions of service quality, based on a much wider range of service attributes. The example used is that of GP based family planning services. Different models of çgood' service are developedand incorporated into the physical accessibility measures. Comparison is made of the patterns of access to GP services under the range of accessibility measures, and under different models of service provision. The resultant geographical patterns indicate that, in some cases spatial inequalities in the service quantity are compounded when service quality is considered. UNIRAS, a mainframe based interactive mapping and modelling system is used for map display.

WOMEN'S SMALL-SCALE ENTERPRISES IN RURAL KENYA: COPING WITH ISOLATION by Helen Ruth Aspaas, Geography Department, University of Colorado-Boulder, Boulder, Colorado 80309

As Kenya's economy becomes increasingly cash-oriented, women are engaging in small-scale enterprises in order to generate incomes. While a growing body of literature examines small-scale enterprises in the context of Kenya's market economy, questions relating to the spatial-gender dimensions have not been addressed. More specifically, little is known about the responses women make to isolation from market centers in managing their small-scale businesses.

The purpose of this paper is to suggest directions for research that will lead to a clearer understanding of spatial influences on women's small-scale enterprises. More detailed questions address women's marketing skills, entrepreneurial talents and access to formal financial services as influenced by isolation.

The government of Kenya is promoting small-scale enterprise development as a means of achieving fuller employment and more equitable rural development. A clearer understanding of spatial constraints on women's participation in small-scale enterprises should lead to policy formation that is more responsive to rural women's income generating needs. Policy implications can likewise be extended to other Third World market economies that are encouraging small-scale enterprises while recognizing women's potential to contribute to rural development.

SPATIAL PATTERNS IN THE DISAPPEARANCE OF CHICKENS FROM ILLINOIS FARMS by Paul F. Mattingly, Illinois State University, Normal, Illinois 61761 and George Aspbury, Illinois State University, Normal, Illinois 61761

During the last decade or so, a number of authors have assessed the kinds of spatial patterns--i.e., random, more-even-than random, or clustered--involved in the devolution of phenomena. The goal here is to examine another empirical pattern in the hope that some underlying generalities in these patterns will eventually be ascertained. The example scrutinized here is the disappearance of chickens from farms in Illinois. In 1940, most Illinois farms had chickens on them; few did so by 1974

Of the possible three general kinds of patterns, the one exhibited by chickens clearly is a clustered one. In assessing whether this pattern is a core-to-periphery or periphery-to-core type, we formulated two definitions of the term core: 1) as a concentration of relatively prosperous farms (measured by the average value of farm products sold or consumed on the farm by county in 1940), and 2) as areas in which chickens were relatively concentrated in 1940 (measured by the density of chickens per square mile of land in farms by county). The change by county in the percentage of farms with chickens between 1940 and 1954 constituted the dependent variable. Simple linear regression indicated that the overall clustered pattern contained elements of both subtypes.

PLANIMETRIC ACCURACY OF VARIOUS METHODOLOGIES USED TO INCORPORATE DIGITAL ELEVATION DATA INTO A GIS FOR THE PRODUCTION OF SLOPE CLASS MAPS by Joseph H. Astroth, Jr., Department of Geography, University of Missouri-Columbia, Columbia, Missouri 65211, R. David Hammer, Department of Agronomy, University of Missouri-Columbia, Columbia, Missouri 65211, and Timothy L. Haithcoat, Geographic Resources Center, University of Missouri-Columbia, Columbia, Missouri 65211

The Conservation Compliance provision of the 1985 Food Security Act requires that farmers owning "highly erodible" land develop and implement a conservation plan by 1990 or within two years of completion of a soil survey, if they wish to continue to receive government benefits. Compliance will require a massive effort to produce slope-based erodibility maps for millions of affected acres of agricultural land throughout the U.S. Elevation data incorporated into a GIS has great potential for providing slope class maps for conservation planning and soil survey. Soil properties and soil distribution are highly correlated to geomorphic and landscape patterns which can be identified from contour data. Various methodologies exist for using a GIS for the production of slope class maps. This paper focuses on the planimetric accuracy of these various methodologies. The GIS generated maps are compared to maps based on extensive on-site measurements. Residual maps of the areal differences between the GIS generated and field data maps of slope class are produced for each of the various methodologies employed. Two test sites are being utilized in this study. Both sites are located in Atchison County, Missouri. Digital elevation data has been collected at both a ten meter and thirty meter resolution. The topography ranges from the deeply dissected Missouri River loess bluffs to the undulating loess-covered till plains to the east. A wide range of slope steepness, lengths, and aspects is available within these landscapes, allowing thorough assessment of the suitability of these various GIS-based methodologies to separate slopes of varying steepness and lengths.

SOME GEOGRAPHIC IMPLICATIONS OF THE EMERGING GLOBAL ECONOMY by C. Murray Austin, University of Northern Iowa, Cedar Falls, Iowa 50614-0406.

The purpose of this paper is to present the preliminary results of the first stage of a long term project examining the ways local and regional geographic systems are being affected by several types of contemporary economic change. The paper discusses how recent information and communications technologies are affecting patterns of spatial interaction. It also examines how dramatic changes in the organization of business enterprises are helping to create new urban industrial and commercial landscapes. Finally it discusses how the changing concentrations of economic power are influencing the political geography of many areas.

The paper is based on a review of selected recent works and a critical re-examination of several conclusions found in the existing literature. Selected data is analyzed for a few specific places to strengthen and illustrate the points made.

The principal conclusions focus on the effects that transnational patterns of economic control (through mergers, buy outs, and various joint ventures) are having on locational tendencies and economic growth. Another set of conclusions focus on the increasingly complex linkages that are the product of major changes in communications, control, and information technologies. The final set of conclusions revolve around the loss of community and even national influence or economic decisions while increasingly being forced to compete politically for various economic activities. The evidence presented reinforces the position that much of this political competition exerts a net social and economic cost on all the communities involved.

AN EMISSION REDUCTION STRATEGY FOR PROTECTION OF THE GLOBAL CLIMATE by Wilfrid Bach, Center for Applied Climatology and Environmental Studies, University of Münster, Robert-Koch-Str. 26, 4400 Münster, Federal Republic of Germany.

This paper presents a greenhouse gas reduction strategy as the scientific basis for the proposed climate protection convention. The individual steps are: assessment of current and future emission rates by gas and source; estimation of future global mean changes of trace gas concentrations and surface temperature based on model calculations; setting of a permissible ceiling for global warming at 1-2°C by 2100; estimation of the required global emission reduction rates by gas and source to stay below the set ceiling; allocation of the required emission reduction rates by gas, source and country; assessment of the total existing reduction potential (technical, economic, ecological) by gas, source/sector, country and measure, and comparison with the model-calculated required emission reduction and monitoring of progress in emission reduction by a UN agency.

Protocols will require specific reduction plans. Halocarbon production reduction plans are presented for the globe, the EC, and the FRG. CO_2-emission reduction plans are outlined for the globe and the FRG. To limit the global warming to 1-2°C by 2100 requires an initial global CO_2-emission reduction of 35% by 2000 over 1980 levels. Control action is required, however, at the national level. The FRG share in the CO_2-emission reduction during 1990-2000 would be 36 million tons/year (compared with current emission of 750 million tons/year). Cursory studies show that the existing reduction potential already allows us to meet 85% of the FRG reduction requirements over the next decade. The good news is thus that the CO_2 and climate problem appears to be manageable - if there were the political will to do so.

UNEMPLOYMENT EXPERIENCE AND THE DURATION OF RESIDENTIAL SOJOURNS by Adrian J. Bailey, Dartmouth College, Hanover, New Hampshire 03755.

This research examines the relationship between the unemployment experiences of a national sample of young adults and the durations of their residential sojourns in particular localities. The investigation focuses on those factors which control the length of a sojourn rather than on a comparison of the characteristics of migrants and non-migrants. The simple proposition that unemployed individuals migrate is replaced by two propositions that are drawn from the theory of job search. The first suggests that individuals who have a previous history of unemployment will lower their initial reservation wages and are therefore more likely to find local employment and prolong their sojourn in the region. The second proposition contends that currently unemployed individuals are likely to have shorter sojourns because they face cumulatively rising costs for local job search along with the exhaustion of local search opportunities, and these factors favor migration and non-local job search.

A survival analysis of the sample of young adults in the National Longitudinal Survey of Youth indicates that individuals who have been unemployed in non-local labor markets tend to experience shorter sojourns. The research concludes with a discussion of the implications of these findings for understanding the relationship between unemployment experience, job search and migration.

THE CHANGING SOCIOECONOMIC STRUCTURE OF THE CITY: THE CASE OF TORONTO, CANADA by Tim Bailey, University of Western Ontario, London, Ont. N6A 5C2

Many of the traditional urban-economic models are based on the notion that higher socioeconomic groups reside at the periphery of the urban area to satisfy their desire for low density housing and more land. Yet, suburban developments in Canada, Europe, and parts of the United States take place within a planned environment and are generally subject to numerous constraints resulting from more restrictive land use control systems than previously experienced.

This paper examines the centripetal income shifts that are evident in those North American cities which are subjected to peripheral containment. Within the context of traditional neo-classical theory, a model is introduced to predict intraurban income distribution in a polycentric metropolitan area. Income and lot size restrictions are incorporated into a utility maximizing household budget equation. The model is tested using Toronto, Canada as a case study.

INDIGENOUS ENTREPRENEURSHIP: THE CASE OF HANDICRAFTS by Gregory K. Bain Department of Geography, University of Florida, Gainesville, Florida 32611

As practitioners of small-scale or micro-scale entrepreneurship, America's handicraft producers make a significant impact upon local and regional economies. Past estimates have indicated that up to 350,000 crafters are responsibile for anywhere from $500 million to over $3 billion in annual sales.

This paper examines results of a preliminary survey of handicraft co-op members in selected areas of the U.S. Southeast and Middle Atlantic regions. Co-op members were chosen for study because co-ops have often been promoted as a means of providing rural residents with enhanced access to urban markets for both inputs and sales of product. This paper reports on a comparative study of the entrepreneural success of rural and urban co-op members to determine characteristics related to this success across a wide range of product types.

BANKING REGULATIONS AND PERSISTENCE, DEREGULATION AND CHANGE; A CASESTUDY OF BANKING IN RURAL OHIO by Nancy R. Bain, Ohio University, Athens, Ohio, 45701.

In the time before deregulation, banks remained a stable feature in the small town landscape persisting as other central activities concentrated in larger urban centers. That persistence was undermined by various legal devices and the recent move to deregulation, and now the substantial changes associated with new banking have an impact on the economic and development landscape of Appalachian Ohio.

As competition through favorable interest rates replaces conveniences and services, scale economies begin to take a larger role in the industry; the options in response to these changes are clustering. The natural geographic area of the bank was initially governed by regulation and local factors; however, decades of economic and population decline and stagnation modified the pattern. Subsequent deregulation and associated changes in economic environment modified the areas still more especially as conditions favored banks with urban links that created comparative advantages. A casestudy of the postwar banking environment in depressed rural area is the baseline for projections of the impacts of deregulation on the development loan environment in Appalachian Ohio.

INTERSPERSION OF HABITAT ELEMENTS AND ANIMAL MOVEMENT MODELING by Bryan Baker, University of Minnesota, Minneapolis, MN 55455-0405.

The interspersion and arrangement of habitat elements helps determine animal abundance. Interspersion has become even more significant with increasing fragmentation of habitat. Yet few methods have been developed to incorporate this geographical notion into evaluation of animal habitat. A chief difficulty has been in dealing with the complex pattern of the environmental elements. One approach has been to develop environmental indexes, such as area-perimeter ratios, connectivity measures, and spatial autocorrelation indexes.

An alternative method would be to model the movements of animals in a patchy environment. A movement approach avoids reducing the complexity of habitat by dealing with it indirectly, through the response of the animal to its environment. A stochastic, temporally-dynamic approach to modeling may have promise in this effort. Adding a spatial component to this approach may help assess the effects of arrangement of habitat elements.

LAND USE AND COVER ON AERIAL PHOTOGRAPHS: USGS CLASSIFICATION by S. Baker, Department of Geography and Planning, East Carolina University, Greenville, North Carolina 27858.

The U.S.Geological Survey has been mapping land use and land cover nationally since the mid 1970's. The classification system is described in Geological Survey Professional Paper 964 published in 1976. It is a hierarchical classification structured at two levels of complexity. Level I consists of nine broad categories while Level II is a more detailed elaboration of the nine. The thirty seven Level II categories are depicted on the national map series published by the USGS at 1:250,000 and 1:100,000. Polygons of uniform land use or land cover on these maps are identified by a two digit code. The classification system allows for further expansion by users. If more detail is needed the Level II categories may be used as a basis for expansion and the creation of new categories at Level III. Each of these may in turn be elaborated to produce a tailor made, greatly detailed Level IV classification.

The classification system was devised for use with remotely sensed data. In order to train students who will be using Level II maps throughout their careers, I set out to assemble a collection of aerial photographic examples. Work was conducted at the Aerial Photography Field Office of the U.S.Department of Agriculture (ASCS) in Salt Lake City. The assembled collection of mostly 1:40,000 black-and-white aerial photographs shows all thirty seven Level II land use and land cover types. Stereo pairs were selected to contain as many Level II categories as possible, and are very effective when used with the detailed descriptions in Professional Paper 964.

LIVESTOCK GRAZING FOLLOWING FIRE SWITCHES TREE DOMINANCE IN A SUBALPINE FOREST by William L. Baker, University of Kansas, Lawrence, Kansas 66045

Domestic livestock grazing is partly responsible for some major changes in vegetation, such as the conversion of desert grassland to mesquite shrubland. Yet, conventional successional theory and land management practices are based upon the assumption that the effects of grazing are generally reversible in a few years or decades if livestock are excluded.

I collected data on pre- and post-fire tree composition and size class structure for subalpine forests on two sides of a cattle fence on a uniform hillside at about 3350 m elevation near Pike's Peak, Colorado.

The two sides had similar pre-fire forests, dominated by many 10-60 cm diameter *Picea engelmannii* (Engelmann spruce) and a few *Pinus aristata* (bristlecone pine). Post-fire forests on the lightly-grazed side of the fence are similar to pre-fire forests. However, post-fire forests on the more heavily-grazed side of the fence are dominated by *P. aristata*, with only a few *P. engelmannii*. Ages of the largest *P. aristata* on the heavily-grazed side correspond with a time when cattle grazing intensity was permanently reduced to 20% of its former level. Due to the long lifespan of *P. aristata* (up to about 1,500 years), the two sides of the fence would probably remain distinct for centuries even if cattle were permanently excluded from both sides.

These data add to evidence that vegetation should not always be viewed as a renewable resource. Successional outcomes on a single site are potentially diverse, depending on livestock grazing and perhaps other environmental conditions during the years after the disturbance.

DEVELOPING AN EXPERT SYSTEM TO CLASSIFY IRRIGATION SYSTEMS. by C. S. Balachandran, Kent State University, Kent, OH 44242, M. Svendsen, and R. Meinzen-Dick, Food Production Policy Policy Program, International Food Policy Research Institute, Washington DC 20036.

Research is underway at the International Food Policy Research Institute, Washington DC to develop criteria to evaluate irrigation systems' performance in Africa and Asia. As part of this project, an integrated scheme for classifying irrigation systems is needed and has been developed. In order that this classification system may gain wide dissemination, and thus help in the creation of a uniform database of irrigation systems which could then be used for useful comparison of similar irrigation systems, an expert system approach was chosen. In this paper, the rationale for using this approach and also a general description of the expert system itself are presented.

GEOGRAPHY EDUCATOR PREPARATION: TRENDS AND PROGRAM IN ONTARIO; a Panel Presentation and Discussion by Colin J. Ball, Marilyn Brown and Wilf Ramey, Ontario Association for Geographic and Environmental Education, c/o Faculty of Education, University of Windsor, Windsor, Ontario, N9E 1A5.

Panelists will present: evolution of philosophy, the purposes, past practices, enrolment and admission policies, and program thrusts, an example of a Geography Methods and Curriculum Course; current field practica and organization in schools.

Each will present for approximately 20 minutes, to be followed by a question and answer period. Audience involvement in discussion about comparisons to other jurisdictions will be encouraged.

Geography educator preparation seems to be progressing in Ontario.

CELLULAR AUTOMATON IN A GIS FRAMEWORK by George L. Ball, University of Arizona, School of Renewable Natural Resources, Tucson, Arizona, 85721.

Following ridge crests on a topographic map, programmable image classification, and dynamic modelling are examples of tasks that current GIS programs can not handle. A solution to these problems is supplied by the CELL operator of PROMAP (C). PROMAP was developed under the research umbrella of the Integrated Dynamic Ecological Analysis System (IDEAS) and is a real number simulation system modeled after raster based GIS. It incorporates many GIS type functions of which the CELL operator is a special function using cellular automaton techniques to give the user external control over the actions of the operator through a script file. This paper gives a brief overview of PROMAP and discusses how cellular automata principles can be applied to various problems related to geographic and natural resource analysis and assessment.

BOX-JENKINS MODELLING OF GREAT SALT LAKE WATER LEVELS by Robert C. Balling, Jr., Department of Geography, Arizona State University, Tempe, Arizona 85287.

Between September, 1982 and June, 1983, the Great Salt Lake in western Utah rose an unprecedented 1.5 m resulting in serious economic and environmental damage to the area. Several researchers analyzed snowfall, temperature, and precipitation data from the watershed and concluded that the climatic events leading to the rise in the lake have a recurrence interval of about 100 years. Other information suggested a much longer recurrence interval for the unusual climatic events of the early 1980s. In this investigation, a Box-Jenkins model is applied to the long-term (1848-1987) water levels of the Great Salt Lake. The residuals from the model show that the recent disruption in the lake levels is more than twice as large as any previous change in the 140-year record. Further statistical analysis of the Box-Jenkins residuals produces a recurrence interval of approximately 7000 years for the recent rise in the lake; the result is an order of magnitude higher than most previous estimates. The Box-Jenkins modelling approach used in this study appears to be useful in assessing a multi-dimensional departure from "normal" climatic conditions.

MODELLING CONIFEROUS WATERSHED PROCESSES AT LARGE SPATIAL SCALES by Lawrence E. Band, Department of Geography, University of Toronto, Toronto, Ontario M5S 1A1

A distributed soil moisture and runoff model is integrated with an ecological model of coniferous tree evapotranspiration and productivity and executed over regional scales. Simulations are run to explore the effects of aggregating geographic fields over a range of spatial scales to perform model parameterization. A capability is developed to 'telescope' the representation and simulation of watershed dynamics from large regional scales down to the hillslope level by explicitly building in a hierarchical data and simulation structure that allows dynamic aggregation of terrain for representation and parameterization. Results show that error production and propagation for regional, distributed simulations can be explored and controlled by producing a functional partition of the surface into entities with predetermined variance tolerances that are dependent on the local nonlinearity of the models.

ZAMBIA'S ADOPTION AND IMPLEMENTATION OF A POPULATION POLICY : A LOCAL AS WELL AS A GLOBAL CHALLENGE. A PAPER PREPARED FOR AAG MEETING by Greata Banda, Department of Geography, University of Manitoba, Winnipeg, Manitoba, Canada , R3T 2N2.

With an estimated population of 8.1 million and a total land area of 753,000 square kilometres, Zambia has no population land ration problem in absolute terms. The population density of 10.8 persons per square kilometre is very low when compared to population densities in a number of Asia countries. But Zambia has many other population problems which are un related to the absolute density.

Like many other African countries, Zambia has a very rapid growing population. The annual growth rate has increased steadily from 2.1 0percent between 1950 and 1955 to 3.7 percent in 1989 (CSO 1985; PRB 1989). Zambia's economy has been declining since 1977. This has had a very negative effect on the quality of of life among Zambian citizens. About 70 percent of Zambia's households have incomes below the level of a basic need.

As a way of trying to regulate the rapid population growth and improving the it's citizens' standard of living the Zambia government adopted a population policy on May 17, 1989. This paper seeks to review the circumstances which forced the Zambian government to adopt a policy, analyse the contents the policy and assess Zambia's potential to implement it. The survey which the author conducted in Zambia between May and August 1989 will be analysed both qualitatively and quantitatively.

INDIAN MULTINATIONALS IN ASIA: GEOGRAPHY & INDUSTRY PATTERNS: by Raja Banerji, Department of Geography, University of Kentucky, Lexington, KY 40506-0027.

Till recently, a country like India viewed herself as host to foreign investors. Today, India is a host to firms from the developed world and is also a home country to a new generation of international firms.

This paper would trace the origins of Indian Multinational Corporations and discuss some of the major reasons for their growth. Specifically, this paper will analyze the role of a particular Indian MNC in regional development. Economic and geographical indicators of the region concerned will be discussed and compared before and after the setting up of the plant. Questions such as locational factors, income and employment generation, labor structure will be examined.

In the context of the economy of the region examined, evidence indicates that the benefits of the establishment of the MNC relate basically to employment generation, acquisition of basic production skills by the local labor and a general improvement in the standard of living.

PETROLEUM BOOMS, AGRICULTURE, AND INTERNATIONAL TRADE: AN ANALYSIS OF THE NIGERIAN EXPERIENCE USING THE EXPANSION METHODOLOGY by Steven M. Banks, Illinois State University, Normal, Illinois 61761

In recent years a great deal of research has been directed towards understanding the impacts of "booming" sectors of an economy, often characterized by the discovery and exploitation of highly sought after natural resources such as petroleum, upon more traditional sectors of an economy. This paper analyzes the impacts of Nigeria's petroleum boom of the 1960s, upon the restructuring of her agricultural imports and exports. The Expansion Method is employed in order to investigate both the effects of: a) the level of petroleum exports, and b) the growth rate of petroleum exports, upon the growth rate of agricultural imports and exports. Linear formulations reveal the existence of important underlying trends, which are then investigated in more detail using quadratic formulations. The results of this study generally contradict more conventional wisdom surrounding Booming Sector theory, which holds that such booms lead to an immediate and sustained stagnation of traditional sectors, and are thus detrimental to an economy. However, the conclusions of this study reveal that Nigeria's petroleum boom has had *differential* effects over time: in the short run, oil *stimulated* the growth of agricultural exports as oil revenues were channelled back into the traditional agricultural sector. Only in the longer run were the hypotheses proposed in traditional theories on booming sectors proven correct, as various oil-induced economic imbalances and distortions in the Nigerian economy emerged, leading to both a stagnation of agricultural exports, and a rapid increase in agricultural imports.

THE EVOLUTION OF A FRONTIER SETTLEMENT: THE CASE OF VLADIVOSTOK, 1860-1913 by Elena A. Baranov, Department of Geography/Geology, University of Nebraska--Omaha, Omaha, Nebraska, 68182-0199.

Founded in 1860, Vladivostok was established as a military outpost to strengthen Russia's presence in the Pacific and to serve as the headquarters for the military detachments assigned to the Far Eastern territory.

By the end of the 1880's, however, Vladivostok began to emerge as a trade center between Russian settlements in Eastern Siberia, the Far East and the Pacific rim countries. Completion of the Chinese-Eastern and Ussuri Railways, modernization and improvement of port facilities and extension of free-trade zone status allowed further expansion of economic links and by 1910, Vladivostok became one of the most rapidly growing urban centers in the region.

The purpose of this paper is to examine the historical development which characterized Vladivostok's evolution from a small, frontier settlement to a major commercial hub with strong international orientation, ethnically diverse population and an extensive economic hinterland.

DEVELOPMENT OF A GEOGRAPHIC INFORMATION SYSTEM DATABASE TO STUDY FENNEL DISTRIBUTION ON SANTA CRUZ ISLAND, CALIFORNIA. by Jeffrey D. Colby and Jon M. Barbour Department of Geography, University of Colorado, Boulder, Colorado 80309.

The purpose of this project was to develop a temporal geographic information system (GIS) database to further the understanding of fennel (*Foeniculum vulgare*) distribution on Santa Cruz Island, California through time. This database was utilized to trace the expansion of fennel from a known point of introduction from the last century to the present.

A combination of existing and derived data sets were integrated into the database. First digitization of U.S.G.S. 7.5' topographic maps provided infrastructure information and data from which slope angle, aspect and elevation values were derived through interpolation. Secondly, thematic data were digitized including, geology (data provided by Geology Dept. U.C. Santa Barbara) and vegetation type (Minnich, U.C. Riverside). Grazing intensity and type (sheep, pigs, cattle), soil disturbance (pigs and erosion), soil type and characteristics (soil order, texture, organic content, nutrient content, pH and moisture holding capacity) and distribution of fennel in terms of plant density through time (data provided by personal observations of S. Beatty, Dept. of Geography University of Colorado) were incorporated into the database.

Funding for this project was provided by a grant from the Nature Conservancy to Susan W. Beatty.

THE ORGANIZATION OF FLEXIBLY SPECIALIZED MASS PRODUCED ATHLETIC FOOTWEAR: A CASE STUDY OF NIKE INC. by Richard Barff and Michael Donaghu, Department of Geography, Dartmouth College, Hanover NH 03755

Over its twenty-five year history, Nike has developed a complex set of production alliances with manufacturers in South East Asia. Athletic shoe production now takes place under several different subcontracting arrangements that allow the company a high degree of flexibility in dynamic and fluid markets. Based on interviews with company officials, this paper describes in detail Nike's present production partnerships, which include conventional capacity and complementary subcontracting types, as well as newer forms. In so doing, we illustrate how Nike exemplifies, *par excellence*, a modern production system within the new international division of labor. The main thrust of this paper, however, is to show that even though Nike relies on predominantly Fordist means of production and manufactures and markets a relatively low technology, standardized product, the company exhibits many other characteristics of a flexible (Post-Fordist) firm. In one sense, then, Nike straddles the divide between rigid and flexible regimes of accumulation, and because of this, provides a means of arriving at a deeper understanding of what many believe to be a profound transition from a Fordist to a Post-Fordist era of capitalist accumulation.

MULTI-FRACTAL REPRESENTATION OF CLOUD-RADIATION INTERACTIONS IN CLIMATE MODELS by Howard W. Barker and John A. Davies, Dept. of Geography, McMaster University, Hamilton Ontario, Canada L8S 4K1.

The horizontal resolution of multi-layered global climate models (GCMs) is approximately 200-500 km. Obviously, many physical processes occur over scales below this resolution. In light of recent advances in dynamical systems theory which demonstrate the importance of small scale processes to the overall evolution of the system, care should be taken to account for sub-grid processes within climate models. This report outlines empirical and theoretical support for the use of a multi-fractal representation of the interaction of cloud and radiation fields in the sub-grid regime of GCMs.

Observations of clouds by satellite imagery, lidar backscatter, and in situ sampling show high variability of water distribution occurring over a vast range of spatial scales. This implies, as expected, that clouds lack a characteristic scale. The same is true of the radiative transfer equation. As such, the interaction of these fields appears to be ideally suited to the scale invariant representation provided for by multi-fractals. Using NOAA-9 (AVHRR) satellite data (1 km nominal resolution at nadir) we show that radiance fields of single layer cloud fields over ocean often exhibit co-dimension functions in accord with those associated with multiplicative cascade processes. Also, we outline other related experiments in progress as well as present the proposed radiative transfer algorithm for use in GCMs.

OPEN SYSTEMS LIVING IN A CLOSED BIOSPHERE: A NEW PARADOX FOR THE GAIA DEBATE by Connie Barlow, ARTA, Inc., 1001 Fourth Avenue, Suite 4730, Seattle, WA 98154 USA.

While energetically open, the biosphere is appreciably closed from the standpoint of matter exchange. Matter cycling and recycling is hence a necessary and emergent property of the global-scale system known as Gaia. But how can an aggregate of open-system life forms have evolved and persisted for billions of years within a planetary system that is largely closed to matter influx and outflow? The puzzling nature of a closed yet persistent biosphere draws our attention to the course of evolution of fundamental metabolic strategies and matter-capture techniques. It suggests a facet of the Gaia hypothesis, framed in terms of persistence: The oceans, atmosphere, soils and biota constitute a complex system which maintains and adjusts matter cycling and recycling within the constraints of planetary closure such that open-system forms of life can persist. This weaker version of the Gaia hypothesis may be useful because it readily lends itself to at least one form of test: What is the solution to the closed biosphere puzzle, and does it indicate that Gaia merits status as a discrete entity? We suggest several disciplines within the field of biology that migh provide tools and perspectives toward reaching a solution. These disciplines include artificial closed ecosystems, prokaryote evolution, the nexus of thermodynamics and evolutionary biology, and hierarchy theory in ecosystem modeling and evolution theory.

MILITARY RETIREMENT MIGRATION: PATTERNS AND IMPLICATIONS by C. Taylor Barnes, United States Air Force Academy, Colorado 80843

Department of Defense policy concerning the stationing of active duty military personnel has both a short and long term impact on population redistribution patterns. In addition to the high rate and volumn of active duty military and dependent migration, the movement of military retirees compounds the impact. With a strength approaching 1.5 million persons, the geographic patterns of the retired military population reflect the long term effects of the stationing of the active force. Each year approximately 50,000 military members retire from active duty and select a retirement location. An experiential base model is tested at an aggregate and individual level using survey data from military retirees in the Rocky Mountain region. The hypothesis that military retirees select a retirement location based on their military experiences is tentatively accepted based on a high relationship between location of installations and military retirees. Similarly, when bases close, retirees have a propensity to move. The data support the conclusion that active duty experiences appear to be excellent predictors of retiree locations.

COMMUNITY DEVELOPMENT BLOCK GRANT PROGRAMS: Planning in a Rural Context by Kim D. Barnes, Philip D. Koos, Jr, Northern Tier Regional Planning and Development Commission (NTRPDC), Towanda, Pennsylvania 18848, John Frazier, SUNY Binghamton, Binghamton, New York 13901.

Community Development Block Grant Programs, while having the goal of assisting community planning and development efforts, have received different local emphasis in the United States. This is in part due to the substantially different needs of communities. This is perhaps no more striking than in the cases of urban and rural planning efforts. The purpose of this paper is to analyze two CDBG programs over a ten-year period in order to illustrate different goals and different geographic outcomes and differences in the public participation process.

The NTRPDC is largely an economic development region in the northern tier of the State of Pennsylvania. Across the PA-NY border lies the Binghamton, New York, Metropolitan Statistical Area, which contains a central city of more than 50,000 persons and a metropolitan area of approximately 180,000 people. These two regions provide the basis of a comparison of CDBG program applications. The paper reviews CDBG guidelines, the goals of each community regarding CDBG planning and the outcomes of CDBG expenditures, and the role of public participation.

EFFECTS OF TEXTURE, COMPACTION, AND VEGETATIVE COVER ON GULLY EROSION ON RECLAIMED FIELDS by Michael L. Barnhardt, Memphis State University, Memphis, TN 38152.

Active gully erosion in the loess bluffs of Meeman-Shelby State Park in southwest Tennessee is closely associated with the occurrence of large, grassed fields on uplands used for recreation. These open grassed areas are compacted by foot traffic and exhibit decreased infiltration rates which lead to increased runoff that is channeled into gully headcuts. The compaction is enhanced by the near surface position of an argillic horizon exposed by soil erosion during previous agricultural activities. Four groups of fields are examined-high, medium, and low impact grass-covered fields and reforested fields with no impact. Variables included in the analysis are soil texture and resistance to penetration to 80 cm depth, bulk density to 6 cm, A horizon thickness, maximum clay content, and depth to maximum clay content. Infiltration rates were also determined for representative sites in each field. Discriminant analysis of the four groups shows a significant difference between the fields with penetration resistance within the upper 20 cm being an important discriminator Forested fields have recovered from their agricultural past but even the low impact grassed fields retain considerable compaction and appear to be more affected by the near surface occurrence of the argillic horizon than their forested counterparts.

INDUSTRIAL RESTRUCTURING AND ENVIRONMENTAL MANAGEMENT: THE CASE OF THE FOREST by Brenton Barr, Dept. of Geography, University of Calgary, Calgary, Alberta Canada T2N 1N4

The Soviet press suggests that *perestroyka* (restructuring) which commenced on 10 March, 1988 in the forest sector is still incomplete, that inefficiencies persist, that forest management is chaotic, and that the health of the country's population and survival of its commercial forest are at risk. The Supreme Soviet fired M. I. Busygin, minister of *Minlesprom*, on 10 July, 1989 and replaced him on 3 August, 1989 with V. I. Melnikov. One critic of Busygin noted, however, that unless fundamental changes are made to the structure of Minlesprom, the goals of *perestroyka* will not be achieved, and thus implied that the new minister may also be doomed to fail. A. S. Isayev, confirmed as chairman of *Goskomles* on 13 July, 1989 told the Supreme Soviet that, "if the USSR does not adopt an effective timber utilization policy, then in twenty to thirty years' time, the forests of European USSR, [accessible] Siberia and the Far East will cease to be commercially viable and the country will be forced to purchase wood abroad," and that acid rain has had a strong negative impact on forests in the USSR's western borderlands. Numerous observers note that the chairman of *Goskomles* lacks the statutory authority to ensure effective management of the forest.

This paper examines both structural and spatial aspects of the managerial and environmental dilemmas facing the Soviet forest sector, and the array of incomplete solutions adopted to date, within the broader context of *perestroyka* including the USSR's stated goals of overcoming economic stagnation and ecological depredation.

SCHNURRER'S GLOBAL DISEASE MAP OF 1827
by Frank A. Barrett, Atkinson College, York University, 4700 Keele St. North York, Ontario M3J 1P3.

It is generally believed that the first world map to show a global distribution of disease was the one published in Heinrich Berghaus's Physical Atlas/Physikalischer Atlas of 1848(Barkhuus,1945 p.2002; Jarcho, 1969 p. 414). However two decades before, Fri[e]drich Schnurrer produced a world map showing selected epidemic and endemic disease patterns. The map is in colour. The distribution of Yellow Fever, The Plaque, and Cholera are shown by hand-applied watercolours. Verbal descriptions of disease occurrences are printed at the appropriate locations all over the globe including remote islands. It is a remarkable map.

The original map is 49.5 x 34.5 cm. For the Poster Session at the Toronto A.A.G.meetings a photographic copy of the map at 1/32 scale will be displayed. The map will be represented by 32, 4x6 inch prints to create a map of approximately 24 x 32 inches. A brief description of how I became aware of this map and the bizarre circumstances of how I was able to find a copy will displayed in an accompanying text.

A CHRONOSEQUENCE OF SOILS ON LAKE TERRACES IN NORTHERN MICHIGAN by Linda R. Barrett, Michigan State University, East Lansing, MI 48824-1115.

A chronosequence of well drained soils on four lake terraces in the extreme northwestern portion of the southern peninsula of Michigan was investigated to assess rates of podzolization. The soils occurred on sandy beach terraces of lakes that occupied the Lake Michigan basin. These lake stages were: Algoma (3000 BP), Nipissing (4000 BP), Battlefield (10,000 BP), and Main Algonquin (11,000 BP). Eighteen pedons were examined on each surface. Data from these pedons was then analyzed, using a numerical index of soil development, to determine the spatial variability on each surface. Finally, a representative pedon, chosen from each of the four terraces, was sampled.

Spatial variability of soils appeared to increase with age of the terrace and degree of soil development. Spodic Udipsamments were commonly observed on both the Algoma and Nipissing surfaces. Haplorthods dominated on the two oldest surfaces (Battlefield and Main Algonquin), but degree of soil development appeared to be greatest on the latter. This research supports earlier work by Franzmeier and Whiteside, which suggested that 8000 years are required to develop Spodosol morphology on sandy parent materials in Michigan.

NUTRIENT VARIATION OF SUBALPINE TREE SPECIES IN THE COLORADO FRONT RANGE by Kenneth A. Barrick, University of Alaska Fairbanks, Fairbanks, Alaska 99775-0780.

The purpose of this research is to compare the nutrient status of two subalpine tree phenotypes: shrub-like krummholz and full-form symmetrical trees. Four species are considered, including subalpine fir (Abies lasiocarpa), Engelmann spruce (Picea Engelmannii), limber pine (Pinus flexilis) and bristlecone pine (Pinus aristata). Research sites were selected in five adjacent valleys located on the east flank of the Front Range (south of Rocky Mountain National Park). Foliar concentrations of N, P, K, Ca, Mg, Na, Fe, Mn, Zn, Cu, Mo, B are reported. The nutrient status of krummholz and full-form trees is compared within and between valleys. Plant/soil concentration ratios are also discussed.

PALEOECOLOGICAL CONTRIBUTIONS TO CLIMATOLOGICAL RESEARCH P.J. Bartlein, Dept. Geography, Univ. Oregon, Eugene, Oregon 97403.

The paleoecological record has long provided one of the principal sources of documentation on the history of past climatic variations, and has thereby contributed substantially toward our understanding of how the climate system works. As research in climatology becomes increasingly more focussed on the projection of future climates, the traditional role of paleoecological research can be enlarged. Two interrelated climatological research areas would benefit: (1) the further documentation of the regional-scale response of different environmental systems to changes in global-scale controls, and (2) the validation of climate simulation models. Research in both areas can be motivated by the large uncertainties that currently exist the projected response of the climate system to a doubling of carbon dioxide. Although there is general agreement on the nature of the globally averaged response, there is much disagreement among projections as to the sign and magnitude of the regional responses. Moreover, the potential impacts of climatic changes on ecosystems are also uncertain.

The paleoecological record contains the results of a set of "natural" experiments with the climate system that are similar in scope to the current one, and the record can therefore be used to assess the performance of individual climate models, as well as to validate the general approach. To best realize its potential, paleoecological research should be organized with a view toward (a) establishing networks of multiple paleoecological indicators, and (b) refining the tools necessary for interpreting the resulting data in climatic terms.

GEOGRAPHICAL CHANGES WROUGHT BY THE BIOTA

by Anthony Barton Planetary Biology Unit, Dalhousie University, Halifax, Nova Scotia, Canada B3H 3J5

Evidence is presented of global and continental changes brought about by the biota acting over geological time periods, and attention is drawn to the continuing activity of the biota in present times, particularly with respect to the atmosphere, the ocean and the redistribution of life-essential elements.

The Demise of Pastoralism Among Eritrean Refugees in the Sudan

By Johnathan B. Bascom, Department of Geography and Planning
East Carolina University, Greenville, NC 27858 - 4353

An unprecedented number of pastoralists have resettled in the eastern region of Sudan since the late 1960s after fleeing from the ongoing conflict in the Eritrean lowlands. The nature of the rural economy plays a critical role in determining the strategies unassisted refugees such as these employ to survive and subsist throughout the duration of their exile. In this paper I examine the commodification of grazing rights, a process that is rapidly bringing cattle herds to the point of extinction and jeopardizing pastoralism as a way of life for a large portion of the Eritrean refugee community in Sudan. I conclude that the demise of refugee herds must be understood as part and parcel of changes in the larger political economy of eastern Sudan. Data for this case study were collected during an eleven-month period in 1987 and 1988.

TRYING TO GET IT RIGHT: DILEMMAS OF DOING MULTI-METHOD, MULTI-LEVEL, MULTI-DISICIPLINARY, BI-NATIONAL RESEARCH ON INTERNATIONAL MIGRATION BETWEEN MEXICO AND THE U.S.

by L.Basem, University of Chicago, Department of Sociology and the Population Research Center, Chicago, Illinois, 60637.

Migration researchers are all too familiar with the challenges of sorting out the micro and macro level structures of migration. International migration carries all of these challenges and more; cultural variation and a charged political context add complexity within and between each level of the migration experience.

We have tried to improve on earlier efforts to study international migration between Mexico and the U.S. by assembling a bi-national team of sociologists, anthropologists and demographers to develop, administer and analyze semi-structured questionnaires to randomly selected households in different kinds of Mexican sending communities and to networks of migrants from these communities living in the U.S. Information from these questionnaires is being combined with macro-level information from census and administrative records in order to carry out multi-level analyses.

In my presentation I review how in our project the practical organization and the substantive content of each of these tasks--questionnaire development, survey administration, and data organization and analysis--has been influenced by working in a developing country with researchers from different disciplines and distinct national traditions of social science research.

PRECIPITATION PATTERNS ACROSS THE NORWEGIAN FIORDS AND CENTRAL HIGHLANDS

by Alan Basist, National Weather Service, Baltimore-Washington Airport, 21240.

Mean annual precipitation values for West-Central Norway were correlated with four topographic features. Only two of the these (elevation of a site and its orientation to the prevailing wind) proved significantly related to precipitation variability. Furthermore, elevation has a negative relationship to rainfall, while orientation to the prevailing wind produces a positive relationship. An analysis of the synoptic patterns providing the majority of the precipitation over the study region indicates that much of the precipitable water is contained in the boundary layer. As this air approaches the Norwegian fiords convergence and surface cooling occurs; consequently, much of the low level moisture condenses. Raindrops falling from upper level disturbances scavenges these droplets during their descent, thereby significantly increasing precipitation along the coast and reducing the amount of precipitable water reaching the interior mountains.

HOW IMPORTANT IS CLIMATE INFORMATION FOR INTEGRATED PEST MANAGEMENT?

by Brad Bass, Atmospheric Environment Service, 4905 Dufferin St., Downsview, Ontario, M3H 5T4.

Integrated pest management (IPM) is a method of crop management that uses increased information and improved decision-making tools. One such tool is a computer simulation model that uses climatic or meteorological inputs to predict the onset of an agricultural pest. A simulation model has been developed for the prediction of the second-generation oviposition (egg-laying) of the European corn borer (ECB). Using fifty-six years of temperature observations, 200, twenty-one day sequences are generated for each of ten different initial maximum and minimum temperatures. These sequences are used as input into the ECB model for three first-generation distributions of the larval population.

The results suggest that the first-generation population distribution is more important than the temperature inputs in accounting for the uncertainty in the model output, and that the sampling date, for estimation of the first-generation population distribution, depends on whether the need is for short-term or long-term prediction. This has important applications in IPM systems regarding the collection of data and the quality of information at different locations and at different geographic scales.

LAND TENURE REFORM: THE PANACEA TO AFRICA'S AGRARIAN ILLS?

by Thomas J. Bassett, University of Illinois, Urbana, IL 61801

This paper focuses on the policies and efforts of colonial and contemporary authorities to increase African agricultural production through the reform of indigenous land tenure systems. A periodization of reform initiatives shows the emergence of an evolutionary model of tenure change and agricultural development that continues to dominate the approaches of reformers today. This model suggests that freehold tenure is the panacea to Africa's economic and environmental ills. It is based on the unfounded assumption that private, individual tenure arrangements lead to greater security, efficiency, and productivity. Current attempts of the World Bank to implement sweeping tenure changes to enhance agricultural performance are critically examined. The paper suggests that these efforts are bound to fail because they ignore the dynamic social and political processes that mediate land access and control patterns. Rather thar encouraging greater security, the Bank's initiatives are likely to renew and heighten conflicts over access to productive resources which will ultimately impede improvements in the agricultural sector.

THE BIBLE AND THE SPREAD AND PERPETUATION OF CHRISTIAN MONASTICISM II: CONTEMPLATION AND FORMATION OF THE CHURCH

by Karel Bayer, Department of Geography, University of Wisconsin-Milwaukee, P.O. Box 413, Milwaukee, Wisconsin 53201, U.S.A.

This paper shows the results of continuing research the first part of which was presented in the AAG 1989 Meeting in Baltimore. While the focus of the first part was on Jesus as founder of the new Jewish sect, the second presentation is concerned with Jesus' followers. These people formed the Church and then wrote the Christian Bible based on the Jewish tradition.

Two conclusions can be drawn from the Scriptures of the New Testament, particularly from the Acts of the Apostles and the Epistles. First, the Bible and the Church are inseparably connected. Second, since the early history, the "active" life of the Church was based on contemplation because, in the believers' perception, the mystery of the Church is at its foundation and future existence. The Church is not only a sociological entity but also a supernatural one.

The missionaries of the first century spreading Christianity through the Mediterranean and Middle East, with unparalleled speed in the weak nonviolent and nonforceable manner based their courageous actions on deep contemplative thinking. They became authors of the New Testament Scriptures and their writings became a source of both Christian contemplation and the growth of the Church for almost two millenia.

Comparisons of Fluvial Sediment Budgets, by Timothy Beach, Department of Geography, University of Wisconsin-Eau Claire, Eau Claire, WI 54702-4004.

The number of sediment budget studies has increased steadily since the early 1970s. This growing body of research has been a response to an information gap between soil erosion and sediment yield in watersheds. Knowing the patterns of sediment storage and flux can provide information on landscape denudation and water pollution by sediment. Sediment budget research has attempted to quantify watershed sediment production, sediment storage in geomorphic compartments, and sediment yield from watersheds. Most research has been based on a combination of field studies and model estimates of soil erosion and sediment storage. Researchers have presented the distribution of sediment storage in watersheds based on different geomorphic compartments such as major floodplains, alluvial fans, and stream orders. This paper compares these methods and findings of distributed watershed sediment budgets from different parts of the world. The problem with comparing the findings from this body of research is the lack of standards for methods of study and for compartments of sediment storage. Considering this problem, this paper attempts to synthesize the sediment budget research from regions that have been well-studied and suggests some standards for regions that should be further studied.

ATTITUDES TOWARD LOCAL PUBLIC FOOTPATHS IN GLASTONBURY, SOMERSET, ENGLAND by Margaret Bear, Department of Geography, Boston University 675 Commonwealth Avenue, Boston, MA 02215

Attitudes toward public rights-of-way are related to societal differences and individual experiences of footpath users. Access to the countryside includes issues relating to recreation, agriculture and transportation. Historically, footpaths around Glastonbury have been used for practical purposes, and more recently are important for recreational purposes. The County Surveyor, special interest groups and individuals play an important part in the maintenance of the local footpath network.

Local residents who use footpaths fall roughly into two groups: those who do not own land, the walkers; and landowners. Both user groups tend to maintain strong traditional ties to the countryside.

The attachment walkers associate with the rural landscape motivates their efforts to promote conservation of areas of natural and historical interest. Their attitudes are related to their experiences in the countryside, and reflect their sentiments of familiarity with the rural landscape. Landowners do not necessarily encourage public access to their property. Their attitudes are apparent by the large number of footpath obstructions, unintentional and intentional, which discourage footpath use by the public.

The difference in the attitudes of footpath users is apparent in local disputes concerning the diversion and extinguishment of public footpaths. The attitudes and perceptions about public access that underlie these disputes are interesting indicators of how people's political and social relationships to the countryside have changed over time.

CONSTRAINT-BASED TRANSFORMATIONS IN MAP GENERALIZATION by Kate Beard, NCGIA, Department of Surveying Engineering, University of Maine, Orono, Maine 04469.

Generalization has traditionally been practiced as an individual artistic skill and as such it lacks a universal and consistent definition. Although some general procedural steps can be identified, the diversity of cartographers' approaches to the task has defied formalization and hindered automation. Formalism requires specification of some well-defined and unambiguous rules, bu anticipating rules to cover every possible condition is not practical. This paper explores the specification of generalization as a set of constraint-based transformations, and develops in the following sequence: (1) specification of an exhaustive set of operations to abstract the spatial and nonspatial aspects of a representation; (2) description of the essential information needed to support each operation in the set; (3) development of a model to support the information as defined and facilitate operations in the set; and (4) design of an interface allowing users to specify conditions (constraints) which must remain invariant during generalization.

TEN YEARS OF CHANGE IN A DECIDUOUS FOREST UNDERSTORY by Susan W. Beatty, University of Colorado, Boulder, CO 80309.

In northeastern U.S. deciduous forest, treefall mounds and pits persist for centuries. This microrelief affects the spatial distributions of the understory plant species. In forests of upstate N.Y., I censused the species composition of permanently marked plots on mounds and pits since 1978. I also created new mounds and pits in 1979 to follow their colonization and successional change. I tested the hypothesis that spatial environmental heterogeneity, in the form of the microrelief mosaic, would aid the longterm co-existence and maintenance of species in the community. Using soil measurements and climatic records I related fluctuation in the environment to variation in species importance. Over the eleven years, very little change was seen when considering the entire forest community. Dramatic fluctuations of die-back and re-colonization were seen within individual microsites, however. The new mounds and pits were rapidly colonized, approaching the species composition of older sites within five years. Except for a few species, colonization exchanges between different types of microsites were not found. Even in stressful years (eg. drought), colonization sources for mound sites, for instance, were either other mounds or adjacent communities (eg. old fields) rather than nearby pits. The predictions of the original hypothesis were not supported. An application of island biogeography theory, treating the microsites as islands, may provide a better model of vegetation dynamics in this forest.

URBAN DECLINE, SUBURBANIZATION AND INVESTMENT IN THE BUILT ENVIRONMENT: POSTWAR PHILADELPHIA by Robert A. Beauregard, Department of Urban Planning, Rutgers University, New Brunswick, NJ 08903.

The period from the early 1950s to the mid-1970s in the US was one of central city decline and suburban expansion. The two phenomena subsequently became hopelessly entangled within the story of postwar urban development. The relationship, at its simplest, involves a unidirectional flow of population and employment from the cities to the suburbs. Capital shunned and households, if they had the resources, fled the central cities. The businesses and households that remained—e.g., Southern migrants, outmoded industrial firms—became awash in disinvestment. New investment was primarily concentrated in the suburbs. Using the dollar value of construction investment and counts of new housing units, this paper contrasts the City of Philadelphia with its suburban ring from the mid-1950s to the late 1980s.in order to demonstrate that investment in the built environment behaved quite differently from the spatial shifts of population and employment. Urban decline and suburbanization did not necessarily mean the abandonment of the central city as a site for city building. The spatial and temporal simultaneity of investment, disinvestment and reinvestment under capitalism, compounded by a complex mosaic of uneven development, fractured the correspondence between shifts in population and employment, and, investment in the built environmnet. Such findings enable us to formulate a clearer relation between the built environment, the primary circuit of production, and residential location.

PEASANTS, INSTITUTIONS AND TECHNOLOGICAL CHANGE. GEOGRAPHIC THEORY AND SOCIAL PRACTICE by Anthony Bebbington, Centre for Latin American Studies, University of Cambridge, U.K. and Graduate School of Geography, Clark University, Worcester, MA 01610.

The paper addresses the relationship a geographer may have with international and national institutions involved in the design and diffusion of agricultural technologies. Three criteria are suggested as goals for the work of geographers in such institutions: (1) direct contribution to the development of technology, methodology and policy in research institutions and non-governmental organizations (2) contribution to theory and analysis in geography; (3) contribution to the people upon whom the research is done.

Research in the Ecuadorean Andes was conducted in collaboration with a national institution backstopped by an IARC. The author's research addressed thepractical issue of the design and implementation of agricultural projects and the relationship between these concerns and the overall social goals underlying such rural activities. Through considering these applied issues the study was able to elucidate the more theoretical question of how indigenous social and organizational change is interactively related to techno-environmental changes and state promoted integration of indigenous farming groups into civil society. The applied concern therefore becomes part of the cultural ecological analysis addressing how institutions, emerging forms of small farmer social organization and their respective environmental management activities can be theorized within this geographical tradition. Closing comments are offered on possible ways of making research directly available and useful to resource poor farmers in the design of their own social and agrarian strategies.

ECONOMIC GROWTH IN NONMETROPOLITAN AREAS: A REGIONAL ANALYSIS by Barbara Becker, Department of Geosciences, Southwest Missouri State University, Springfield, MO 65804

Although the 1980s brought a reversal of the nonmetropolitan turnaround, many small towns and communities continue to grow. For nonmetropolitan areas, the shift away from traditional resource dependent economies is creating more diverse economies and attracting businesses traditionally reserved for urban centers. Economic sectors, once perceived as followers of growth, are now catalysts of expansion and nonbasic businesses are attracting outside dollars into local areas. Examination of the shifting economies of nonmetropolitan areas and their growth independent of urban centers may assist geographers in redefining the forces that stimulate growth in a changing economy.

This paper looks at the economic sectors to determine the forces behind continued growth in nonmetropolitan areas of Texas. Included in the study is a survey of firms established in counties affecting nonmetropolitan growth not shown by analysis of economic sectors.

TEACHING PLACE LOCATION: LESSONS LEARNED AND RELEARNED by S. W. Bednarz, Department of Geography, Texas A&M University, College Station, TX 77843-3147, and R. S. Bednarz, Department of Geography, Texas A&M University, College Station, TX 77843-3147

Map exercises, games, computer-assisted instruction, maps of errors, mnemonics and other word clues, brute memorization: these are just a few of the techniques used to teach place location. Teaching place location is a common activity in many elementary and secondary social studies classrooms. Knowing WHERE, the location of cities, nations, regions, and major physical features, is a part of many collegiate geography courses as well. There is, however, little consensus among geographers either on the importance of teaching place names or on the best methods to teach place location effectively.

This paper traces the ebb and flow of the debate on teaching place location through articles published in the *Journal of Geography* from 1902 to the present. Issues of instruction and curriculum are considered, as are the general trends in American education during this eighty-eight year period. Analysis is both qualitative and quantitative.

SATISFACTION WITH LIFE AND COMMUNITY: CITY-SUBURBAN VARIATIONS IN METROPOLITAN TORONTO Kenneth B. Beesley, Department of Geography, Trent University, Peterborough, Ontario, Canada, K9J 7B8.

The purpose of this paper is to describe levels of satisfaction with life and community in core and suburban areas of Metropolitan Toronto. Data were collected through interview surveys undertaken in 1986 and 1987 in the City of Toronto and five suburban municipalities respectively.

Life satisfaction measures focus on life as a whole and eleven domains of life. While City of Toronto respondents indicate higher satisfaction levels than suburban respondents when two indices are used (percent satisfied and mean satisfaction score), a satisfaction index which discounts ambivalent responses suggests satisfaction in the suburbs is not so low. Community satisfaction analyses continue to stress positive aspects of core versus suburban residence. Though life and community in suburban areas are not unsatisfactory, core area residents articulate higher satisfaction levels.

Models of life satisfaction indicate that the most important contributors to satisfaction with life as a whole in the core area are satisfaction with family life, standard of living, and independence. In the suburbs, however, the key contributors are job satisfaction and satisfaction with spare time activities. Models of community satisfaction reveal that, in the core area, satisfactions with people are important contributors. In the suburbs, satisfactions with goods and services and with the community as a place to raise children are more important contributors.

THE VIA MARIS IN LITERARY AND CARTOGRAPHIC SOURCES by Barry J. Beitzel, Trinity Evangelical Divinity School, Deerfield, IL 60015

To equate the Via Maris of antiquity with the Syro-Palestinian sector of that international transportation artery which ultimately linked ancient Mesopotamia and Egypt has become commonplace today in both scholarly and popular traditions. Contemporary literary or cartographic works almost universally treat this equation as an established fact and proceed from it axiomatically. The purpose of this essay is to show that such an equation is not yet even 100 years old in cartographic traditions, and it can be seen only faintly before the 19th century in literary sources. When found before that time in manuscripts or on maps, the Via Maris almost always designates a roadway that linked the post-Crusader fortress city of Acco (Acre) with Capernaum, the town which had headquartered Jesus' Galilean ministry. In light of a combination of 3 resonant factors (literary and cartographic attestation, archaeological profile of Capernaum, physical topography of lower Galilee), it will be proposed that originally biblical phraseology (Isa 9:1 [Heb 8:23]) was resurrected in the post-Crusader period and reassigned an essentially "pilgrimage" function. Moreover, though the question of what is envisaged in Isaiah will be addressed, this essay will contend that modern and contemporary usage of the phrase Via Maris derives from its renaissance in the post-Crusader period, and that the expression, therefore, should not be applied in any sense to a major roadway that linked Mesopotamia and Egypt.

LONGITUDINAL ANALYSIS OF SEQUENCES OF HOUSEHOLD MIGRATION IN THE UNITED STATES by Alain Belanger, Population Program and the Department of Geography, University of Colorado, Boulder CO 80309-0484.

Different migrant types (primary, onward, and return) differ in their socio-economic and demographic characteristics. They also behave differently in their migration timing and selection of destinations. However, explanatory analysis of the reasons for such different behaviors are far from being conclusive. In this paper, I first review earlier findings on the determinants of sequential migration and bring forward the methodological and theoretical inconsistencies that have generated contradictory results. Then, I look for a more satisfying answer to the question of why people with different life histories exhibit different migratory behaviors.

Using new developments in event history analysis, I am making use of information on the timing and the number of events, as well as on their sequences in a competing risk model of sequential migration. Migration is seen as a dynamic process that is linked with the life course. In addition, I acknowledge the importance of the household in the migration decision-making process by making it the unit of analysis. The data were extracted from the 1984 panel of the Survey of Income and Program Participation, one of the latest sources of nationally representative longitudinal data applicable to migration analysis.

FEDERAL HOUSING POLICY AND THE NORTH AMERICAN CITY: A COMPARISON OF OUTCOMES IN THE UNITED STATES AND CANADA DURING THE FORMATIVE YEARS by John Bélec, Nipissing University College, North Bay, Ontario, P1B 8L7, Canada

This comparative analysis of the development of federal housing policy in the United States and Canada focuses on the depression-era of the 1930's. Through research of cabinet documents it is shown that the example of the U.S. Federal Housing Authority had a pervasive influence in shaping the development of housing policy in Canada as initiated with the 1935 Dominion Housing Act. (DHA) This is particularly evident in the promotion of home-ownership and the institutionalization of mortgage lending assessment criteria which contained a suburban bias. Thus by the end of the 1930's both nations had established the financial infrastructure necessary for the promotion of massive post-war suburbanization. An evaluation of the impact of this early housing legislation in Canada is carried out with the use of mortgage lending data contained in the original DHA files. This is compared to findings in the U.S. literature which indicate that the FHA sponsored an exodus of whites from the American inner-city.

THE NATURAL OTHER: EVIDENCE FOR A GEOGRAPHICAL SOCIAL PSYCHOLOGY by Michael M. Bell, Yale University, New Haven, CT, 06511.

Many people experience a deep attachment to places in and aspects of the physical world they deem "natural." Significantly, they will often describe this attachment in terms usually reserved for people, especially those they feel closest to. For example, they will speak of getting inspiration from a waterfall, of having a "love for the land," and of "communing with nature." A few people who experience this attachment most strongly will even speak of using "nature" almost as a therapist, of going into nature to achieve personal understanding and help in finding oneself.

As part of a larger study of ideas of nature in a village on London's commuter fringe, I conducted a series of intensive interviews with six individuals who professed this deep attachment to nature. These individuals often described their attachment in terms of a dialogue with a deeper truth from which moral values could be derived.

The social psychology of George Herbert Mead is instructive for understanding this deep attachment mixed with a search for moral truth. Mead described the mental process of making social and moral judgments as an internal conversation between the self and a "generalized other" which embodies the values of a person's primary group of social attachments. I argue that the deep attachment to nature of these individuals can best be understood as resulting from the use of a *natural other*, a mental construct related to Mead's generalized other.

RELAXING MATHEMATICAL PACKING REQUIREMENTS IN HIERARCHICAL CENTRAL PLACE SYSTEMS by Richard L. Church, Department of Geography, The University of California, Santa Barbara CA 93106 and Thomas L. Bell, Department of Geography, The University of Tennessee, Knoxville, TN 37996.

The classical central place landscape is composed of a uniform triangular lattice of discrete supply and demand nodes. Despite this discrete space assumption, closely packed space-filling hexagonal market areas have been assumed necessary to service all demand. This research suggests that close mathematical packing is an unnecessary assumption. As long as all discretely distributed demand nodes are served by one or more central places, it doesn't matter if interstitial areas containing no demand are served.

The landscape which results from relaxing the packing assumption consists of fewer, more widely spaced central places in which flexibility of consumer choice is reduced while the average length of the journey-to-shop remains the same as its packed counterpart. Previous research demonstrated that in such an unpacked landscape single-level k-systems other than k=3, 4 or 7 are possible. Various geometric configurations of integer, fractional and "mixed" k-systems are stable under particular assumptions about threshold level of support.

The present research extends these findings to several levels of a theoretical central place hierarchy simultaneously. Packed and unpacked versions of a k=3 and k=4 nested hierarchy are compared. New k-systems above the value k=7 not discussed by Losch in his extension of the Christallerean landscape are introduced and the congruence of the theoretical unpacked landscape with location-allocation covering models is highlighted.

THE SPREAD OF RABIES IN PENNSYLVANIA, 1982-1989 by Joseph W. Bencloski, Department of Geography and Regional Planning, Indiana University of Pennsylvania, Indiana, Pennsylvania 15705.

Pennsylvania is experiencing its worst rabies epidemic since the 1940s, and statistics indicate little abatement in the near future. The purpose of this paper is a cartographic and statistical analysis of that epidemic between 1982 and 1989. Results of the county-scale analysis indicate that the epidemic began in southcentral Pennsylvania and spread northeastward, roughly following the trend of the valleys of the folded Appalachians. Since 1986, however, the epidemic has spread largely through the agricultural and urban counties in the southeastern part of the state. Total cases, species breakdowns and trend analyses are presented in this study.

THE PENNSYLVANIA IRON AND STEEL INDUSTRY: REGIONAL PLANNING AND DEVELOPMENT STRATEGIES by John E. Genhart, Shippensburg University, Shippensburg, PA 17257.

The purpose of this study is to review the locational change of the iron and steel industry and to assess how the industry is thriving in Pennsylvania in the late 1980's. The spatial distribution of the industry will be considered in its historical and geographical setting through a review of resources, transportation, markets, labor, technology, governmental policy, and foreign competition. Regional development changes made by USX, Bethlehem, and LTV in Pennsylvania will be analyzed as it relates to the United States steel industry.

Procedures developed by many steel corporations in the state to plan for mini-mills and foreign competition will be reviewed.

AN ADAPTIVE PHYSICALLY-BASED MODEL FOR THE SIMULATION OF HIGH ENERGY WATERSHEDS. David A. Bennett, Department of Geography, The University of Iowa, Iowa City, Iowa 52242.

Water movement and sediment transport in high energy mountain environments are influenced by rapid changes in both terrain and hydrologic conditions. Traditional lumped parameter and non-adaptive physically-based models are inappropriate for the simulation of such dynamic systems. To adequately represent hydrologic processes in mountainous terrain a knowledge-based modeling strategy is adopted which embodies a suite of physically based models. Each model included in this suite represents a specific physical state that the system can assume. For example, as flow changes state from unsaturated to saturated flow or from hyper-concentrated to debris flow, the mathematical models representing runoff and sediment transport also change. Since state change is feature and location specific, a distributed parameter architecture is used which adapts to changing physical conditions. Each terrain element, stored as either a linked one or two dimensional object, contains information about its current state. Given the state of an element, encoded logic identifies and implements an appropriate process model. Detailed terrain information, procedural knowledge about physical processes, and controlling logic comprise the knowledge base necessary to direct simulation efforts in dynamic environments.

THE MYTH OF AMERICA: FROM FRANCE TO QUEBEC by V. Berdoulay, Dept. of Geography, University of Ottawa, Ottawa, Ont. K1N 6N5 and L. Dupont, Dept. of Canadian Studies, St. Lawrence University, Canton, N.Y.

The americanity of the people of Québec depends on the lived experienced of the North American continent, but also on their relationship to the myth of America. As far as they were concerned, they initially shared this myth with the mother country; however, shortly after the British took over Canada, the American and French revolutions made this relationship problematic for the French Canadians. Then, in mainstream European French culture, the myth of America began to shift away from its Canadian referent towards a focus on the United States.

This paper shows how this shift gradually occured in mainstream French thought, and also how the people of Québec adjusted to it. The aim is to cast light on how these adjustments made the Québécois' relationship to France and the United States very difficult and complex in the definiton of their own americanity.

URBAN OR EXURBAN R&D SITES IN CONNECTICUT?

by W.H. Berentsen, U. of Connecticut, Storrs CT 06269-2148

The paper reviews the locational characteristics of research and development (R&D) in Connecticut in order to assess the likelihood that R&D activities could be lured to The University of Connecticut at Storrs, where a technology park, ConnTech Park, is being planned.

Currently R&D activities are highly concentrated in the state's urban areas near corporate headquarters and industrial production sites. Though the state's more rural areas, including the Storrs area, offer some potential advantages for the location of R&D activities, the current locational pattern of research suggests that advantages in urban areas are far greater.

A survey was sent to 200 of the 400 private sector R&D facilities in the state. About sixty useful responses were gathered. These indicate that the great majority of private R&D in the state is applied oriented and is carried out at headquarters locations (often coincidentally production sites) for internal use by multilocational corporations. The most important location factors for R&D sites include access to skilled labor, market, and interstate highways. Very few firms indicated interest in ConnTech as a possible R&D site, and, in general, firms gave Storrs relatively low ratings for its access to important locational factors.

The results of the survey suggest that the Park may have difficulty attracting private sector R&D activities. This has been the case for other University R&D parks, which were established with more fanfare than success and perhaps more enthusiasm than realism.

THE USE OF PRINCIPAL COMPONENTS ANALYSIS TO GENERATE MULTIVARIATE RATING EQUATIONS FOR PREDICTING SEDIMENT LOADS

by Normand Bergeron, State University of New York at Buffalo, Buffalo, New York 14260.

Multiple regression analysis has been widely used to obtain multivariate rating equations in which discharge-based predictor variables are employed to predict suspended sediment concentration. However, such equations suffer from severe multicollinearity, which not only makes them unstable but results in biased estimates of monthly or annual suspended sediment loads. The problem of multicollinearity may be overcome by first performing a principal components analysis on the discharge-based variables and then employing the resulting significant principal components rather than the original discharge-based variables in the multiple regression. The advantages of this approach are demonstrated with the aid of a 36-year record of daily discharge and suspended sediment concentration for the Juniata River at Newport, Pennsylvania. This record is divided into four 9-year periods. Multivariate rating equations employing discharge-based variables on the one hand and principal components on the other are developed for the first and third 9-year periods and used to predict sediment loads for the second and fourth 9-year periods. The equations employing the principal components as predictor variables consistently estimate observed sediment loads with less than do those using the discharge-based variables.

INTERDEPENDENT URBANIZATION: URBANWARD MIGRATION AND GLOBAL INTERDEPENDENCE SINCE THE MID NINETEENTH CENTURY

by Brian J. L. Berry, The University of Texas at Dallas, P.O. Box 83-2130, Richardson, Tx. 75083.

Rates of urban growth are decomposed, country by country, into the parts attributable to natural increase and to net migration. The next migration component is compared with rates of domestic rural to urban migration to obtain, for "receiving" countries, estimates of the contributions of foreign immigration to urban growth. As a corollary, foreign migration streams are decomposed into their urbanward and rural-bound components. For "sending" countries, the portion of urban growth due to domestic urbanward migration is compared with information on rural exodus to estimate net emigration. Matrix techniques are used to break down that estimate into the portions bound for urban and rural locations in receiving countries. The urban portion is urban growth that has been exported from the sending to the receiving countries. Maps of the changing patterns of world trade in urbanization since the mid nineteenth century are the outcome of the analysis. The reveal developing global interdependence that pulsates with long-wave rhythmicity.

UTILIZATION OF A GIS APPROACH FOR MODELING AVALANCHE OCCURRENCE

by Susan M. Berta and Dennis L. Skelton, Indiana State University, Terre Haute, Indiana 47809.

Rapid thaw during the spring of 1989 is believed responsible for triggering two avalanches in the Huerfano River Valley of Colorado. These avalanches are considered complex because they originated from multiple source areas. Traditionally, avalanche hazard mapping has been limited to identifying flow paths from single source areas and is, therefore, often complicated when multiple source areas are involved. This investigation examined the feasibility of using a Geographic Information System (GIS) approach to accurately model flow paths for one of the two avalanche events. The GIS module in the ERDAS software package was utilized for data manipulation. Data planes in the GIS included: land cover information, which was derived from aerial photography at a scale of 1:20,000; topographic attributes from digital elevation models; and field reconnaissance. This data was used to map the various flow paths associated with the avalanche. Employing GIS technology enhanced the accuracy by which the patterns of surface flow could be documented. Implications for successfully utilizing GIS technology in avalanche hazard mapping are presented. Future research will focus on developing a GIS for predictive modeling of avalanche paths.

CHANGING BUSINESS PRACTICES AND THE GROWTH OF THE PRODUCER SERVICES: GEOGRAPHICAL IMPLICATIONS

by William B. Beyers, Department of Geography, University of Washington, Seattle, Washington 98195.

Recent national-scale analyses find that the rapid growth in producer services employment is a result of (1) the overall expansion of the economy, and (2) changing business practices. Changing business practices refers to increased purchases of existing producer services as inputs either through unbundling or through higher levels of open market purchase, or through purchases of "product" or "process" service innovations. New technologies in goods, particularly goods related to information exchange and generation, have been found to facilitate innovation in service industries. Aggregate national statistics show unbundling to be much less important as an explanation for employment growth than technological change in the production of services. This paper discusses geographical implications of these findings regarding development of the producer services, and suggests the type of field work needed to document at the scale of individual establishments the nature of changing business practices in the production and use of producer services.

SENTIMENTAL JOURNEYS: THOUGHTS ON THE NATURE OF PILGRIMAGE

byS. Bhardwaj, Kent State University, Kent, Ohio 44242-0001.

This paper examines some less explored aspects of pilgrimage in geographic literature, and tries to sharpen the boundary between pilgrimage and tourism. Pilgrimage has been generally considered to be a sacred journey. Three elements have dominated the analytical structure of pilgrimage: the sacred object/ place, distance/ path, and the devotee/ pilgrim. The fundamental attribute of pilgrimage, however, is sentiment expressed in some spatial or spatio-psychological dimension. Religious motivation is only one of a variety of sentiments generating the spatial behavior called "pilgrimage". At least two broad categories of pilgrimage, sacred and secular, may be suggested. Sacred pilgrimages are motivated by religious sentiment, expressed in a number of ways ranging from quest for the ultimate source to seeking specific favor of a deity. Secular pilgrimage on the other hand is the spatial expression of attachment to a person, place or an object whose origin and nature are clearly recognized to be non-supernatural but communion with which is the goal of the seeker. Thus, there may be pilgrimages to "nationalistic shrines", sports halls of fame, graves of poets, rock singers, and of revered political or social leaders. What distinguishes these sentimental journeys from tourism is the direction of attachment. For the tourist, the attachment is primarily to oneself; the qualities and attributes of the object are for one's own consumption like any of the other goods or services, instead of them arousing reverence or piety.

Thus, the direction of sentiment rather than the direction of journey may be the touchstone of spatial behavior termed "pilgrimage".

CHANGES IN THE AGE AND SEX STRUCTURE OF INDIA'S POPULATION, 1980-2020 by Shyam S. Bhatia, University of Wisconsin, Oshkosh, Wisconsin 54901.

The purpose of this paper is to seek an understanding of the age and sex structure of India's population in the year 2020 and to determine changes since 1980. The population of India is expected to increase from 687 million in 1980 to 1250 million in the year 2020. Changes in fertility, mortality and longevity during this period would modify the population structure. For this study, population is divided into six segments corresponding to the life cycle: Preschool Years, School Years, Young Adult Years, Child-rearing Years, Empty Nest Years, and Retirement Years. Trends in each life stage are analyzed to understand changes in the age structure. In addition, this paper examines the nature of changes in median age, sex ratio, general dependency, child dependency, aged dependency and male/female life expectancy during 1980-2020.

The proportion of dependent children declines from 40 percent in 1980 to about 25 percent in 2020. The median age of population rises from less than 20 years in 1980 to about 30 years in 2020. General dependency declines from 78 in 1980 to 45 in 2020—a reduction of 42 percent. The 15-64 years age group constitutes 56 percent of total population in 1980, 62 percent in 2000 and 69 percent in 2020. In absolute numbers, the active population is 387 million in 1980 and it would contain 860 million persons in 2020—an increase of 473 million persons in forty years.

FRACTAL DIMENSION AND AREAL UNITS COMPATIBILITY OF GIS DATABASE by Ling Bian, Department of Geography, University of North Carolina, Chapel Hill, NC 27514

Environmental Databases are often multi-thematic. The areal units used to collect data differ among themes. The compatibility among the areal units in terms of spatial scale is one of the important issues for GIS data quality evaluation. Fractal dimension provides an advanced mean to deal with the issue.

Digital soil (SCS) and landform (USGS DEM) data were studied for a watershed in North Carolina. The attribute values of several soil properties and landform variables were extracted with a series of sampling schemes. Semivariance was calculated and analyzed for each of the soil and landform attribute variables.

The plotted semivariograms illustrated how each attribute variable varied over different spatial scales, and how the relationships between soil and landform variables change with the scale. The fractal dimensions obtained from the semivariograms suggested the characteristics of the relationships. The results also suggested the desirable areal units, in terms of spatial dimension, for additional datasets to the current database.

DUNE OCCURRENCE ON THE NAVAJO UPLANDS OF NORTHEASTERN ARIZONA by Paul M. Bieneman, Aquinas College, Grand Rapids, Michigan 49506.

Investigation of the selected geomorphic, meteorologic, and lithologic variables and the occurrence of dunes on the Navajo Uplands of Northeastern Arizona yielded a number of interesting insights into the relationship between dunes and the environment responsible for their existence.

Fifteen variables were selected as possible indicators of dune occurrence. Analysis of the variables by the hypothesis testing portion of the discriminant analysis routine determined the relationship between means of the dune and non-dune group and the discriminating power of each of the variables. Those variables whose means were not significantly different were rejected from further consideration.

Factor scores from significant variables were used in the classification portion of the discriminant analysis routine and produced the model. The model was tested on 100 new sites to determine its classification ability. Factor scores from the 100 "new" sites were classified according to the model developed on the 100 "original" sites. Of the 18 sites classified as belonging to the group dune, 16 were actual dunes. Sixty-nine of the 82 member non-dune group were correctly classified.

As a result of the analysis, it was possible to predict dune prone areas within the study area based upon the physical environmental attributes of specific sites.

INDIANA WRITERS AND THE EXPRESSION OF HOOSIER CULTURE by Bruce Bigelow, Butler University, Indianapolis, Indiana 46208.

In the late nineteenth and early twentieth century a number of Indiana writers created works of fiction which expressed the culture of residents of the state.

Selected works of six of these authors — Eggleston, Thompson, Riley, Ade, Nicholson and Tarkington -- are analyzed in order to define themes of Hoosier culture.

Some of the themes explored include:

1. The geographical source of the settlers and their cultural traits, especially language.
2. The dichotomy between rural and urban settlements.
3. The significance of religion and the relationship between religious groups.
4. The significance of politics and the various activities involved in politicing.
5. The cultural landscape of Indiana.

Investigation of these themes reveals that Indiana had a distinct regional culture which was vividly represented by its leading authors.

THE NATURE OF GEOGRAPHIA. ANDROCENTRISM IN GEOGRAPHY by Elisabeth J. Binder, Department of Geography, University of Minnesota, Minneapolis, MN 55455.

This paper attempts a feminist critique of the "knowledge industry" in general. It is argued that the production of knowledge, seen in the broader context of social production, mirrors the male-centredness of society at large. Thus "science" in its broadest sense is not only largely produced by men, but also its theories and methodologies for the most part generalize the male experience within a given discourse.

However, the extent and the specific form of androcentrism vary between disciplines according to their historical development. What follows is a more "local" analysis of androcentrism in geography, addressing some of the specific traits of the gender bias that still pervades the very basis of the discipline.

At the ideological level androcentrism within geography can be traced back to the historical conditions under which geography was established as an academic discipline. The proximity of geographical research to life-world experience and common sense theories over-emphasized the particular subject positions of those who were establishing geography: white, middle-class men. Due to this proximity, the gender bias (together with class and ethnic biases) affects the "geographical world-view" and "geographical thinking" more directly than in the other social sciences. The same holds true for geographic institutions and their internal organization.

Recently published biographical and autobiographical material written by geographers presents a valuable source for scrutinizing androcentrism at both these levels.

THE GEOGRAPHIC VARIABILITY OF SNOW STRENGTH IN POTENTIAL AVALANCHE SLABS by K. Birkeland and K. Hansen-Bristow, Department of Earth Sciences, and R. Brown, Department of Civil and Agricultural Engineering, Montana State University, Bozeman, MT 59717.

The variability of snow resistance (an index of compressive snow strength) and depth on two inclined slopes in Montana was measured and correlated with variability in the sites' geographic features. An instrument that indexes compressive snow strength by measuring snow resistance was refined, allowing the characterization of an entire snow slab in a short time period. Measurements of depth and resistance were taken at 1 m intervals across and down the slopes. Correlations were tested amongst the variability of the geographic features of the study areas, the snow depth, and the snow resistance. The spatial pattern of trees appears to affect the pattern of snow depth at the first site, where a significant linear relationship (p-value less than 1×10^{-6}) was found between snow depth and average snow resistance. Although a linear relationship exists at that site, the r^2 value (0.357) indicates additional factors may be critically relevant. A second site with greater complexity of geographic features showed no linear relationship between depth and resistance, and complicated patterns of resistance at that site demonstrate that many factors may contribute to snow resistance. Results might provide crucial predictive information of weak zone locations in snow slabs which would improve avalanche forecasting and control techniques.

SPATIAL-TEMPORAL AUTOCORRELATION ANALYSIS OF HIGHWAY ACCIDENTS by William R. Black, Department of Geography, Indiana University, Bloomington, Indiana 47405.

This paper contains a preliminary analysis of the spatial autocorrelation, temporal autocorrelation, and the spatial-temporal autocorrelation of highway accidents on the Indiana Toll Road from 1983 through 1987. In terms of methods, the paper illustrates the application of Moran's I, the Durbin-Watson statistic, and a spatial-temporal autocorrelation coefficient generally attributed to Knox and Mantel to a transportation network situation. Applications of these methods to transport network attributes, such as accidents, have not appeared previously. Empirically, the main question of interest is whether these methods are sensitive enough to distinguish different types of patterns in the attribute distributions and whether these patterns are explainable. The analysis involved ten sets of accident data, categorized by date of occurrence and location on the east or west roadway. Of these, ten reveal positive temporal autocorrelation, five reveal positive spatial autocorrelation, and nine of the ten reveal significant spatial-temporal autocorrelation. Examination of these results suggests the existence of a relationship between the observed autocorrelation and weather conditions at the time of the observed accidents.

LANDSCAPES OF INEQUALITY: ENVIRONMENT AND LOCATION IN ECONOMIC DEVELOPMENT by Paul W. Blank, Department of Geography, Middlebury College, Middlebury, VT 05753.

Environment and location underlie and shape the destiny of many regions. They do not control or determine choices made by people, but they do frame the parameters within which these decisions are made. This seems particularly true in ancient, land-based civilizations such as those of Egypt, South Asia, and China, where environmental and locational advantages of one region over others were historically reinforced. Social and economic theorists who have based their models upon assumptions of neutral and amorphous space risk misunderstanding. The playing-field is not level. Ancient regions, favored by good soils and high accessibility, became the sites of imperial capitals and their attendant bureaucratic apparatuses. In many cases, initial environmental and locational advantages were consolidated by administrative fiat. Resources and tribute flowed from the hinterland to this core, augmenting the further growth of the advantaged region.

As the forces unleashed by the rise of Europe and the Industrial Revolution diffused outward from the European hearth, they encountered these preexisting regional systems in many parts of the Old World. Unlike the relative tabula rasa presented by the sparsely populated wildernesses of the New World, the land-based civilizations of the Middle East and East and South Asia already possessed well-articulated space-economies. At the time of initial European contact they had solidified into complex core-periphery systems. It was in the context of these landscapes of inequality that the drama of integration into the world economy was played out.

THE MYTH OF THE EUROPEAN MIRACLE by J.M. Blaut, University of Illinois at Chicago, Chicago, IL 60680.

The diffusionist belief that Europe was progressing more rapidly than Asia and Africa during and before the Middle Ages, that a "European miracle" was taking place or had taken place, is conventional in European thought and is hardly ever questioned by European scholars. This paper will argue that the belief is unfounded: that the selective rise of Europe did not begin until after 1492. A critique will be given of some of the most influential "European miracle" theories, those put forward by Robert Brenner, John Hall, Eric Jones, Michael Mann, Max Weber, and Lynn White, Jr. In addition, the main causal propositions which support the "miracle" thesis, propositions which derive Europe's supposedly unique progress from environment, genetics, religion, social organization, politics, and intellect, will be laid out for inspection and shown to be unconvincing. Finally, preliminary results will be presented from a study of world history textbooks which was undertaken to explore the ways in which the myth of Europe's permanent and eternal superiority evolves and changes and the ways it is passed down from generation to generation.

COMPARISON OF ICE MARGINAL LANDFORMS IN MICHIGAN'S NORTHERN AND SOUTHERN PENINSULAS by W. Blewett, Michigan State University, East Lansing, Michigan 48824.

The Port Huron and Munising topographic systems, called "moraines" by Leverett and Taylor, mark two conspicuous landform complexes in the northern half of Michigan. Examination of topographic maps, aerial photographs, and soil maps, along with detailed field mapping indicates that surface formations in both areas contain little till, are asymmetrical in profile, and are composed primarily of glaciofluvial and glaciolacustrine sediments. In addition, each displays a facies change from coarse to fine-textured sediments distally, and both contain evidence for several ice marginal positions within tracts mapped as a single end moraine by Martin (1955,1957) and Farrand and Bell (1982). This suggests that the two features are not classic end moraines, but instead are complicated assemblages of landforms that evolved in association with abundant meltwater and stagnant ice during final deglaciation.

WOMEN AND AGRICULTURAL DEPENDENCY: THE GARIFUNA IN HOPKINS, BELIZE by E. Bliss, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53201

The contemporary role of Garífuna (Black Carib) women in agriculture in Hopkins, Belize is supported by historical documentation which cites evidence of their intense involvement in subsistence production throughout Garífuna history in the Caribbean and Central America. Female dominance in subsistence food production has resulted mainly from male migratory wage labor, agricultural and other. The forest industry in Belize attracted Garífuna men in the late 18th and early 19th centuries, leading eventually to permanent settlement there. Literature reviewed affirms Garífuna women's significant contribution to agriculture, despite changes in geographic location and economic conditions. Primary data are from personal interviews and farm visits with Garífuna women. Recent development projects to increase women's economic status have been initiated. Despite relatively recent small-scale economic gains through cash remittances and increased production of citrus in Hopkins, women's main occupation remains subsistence agriculture. Household plots are maintained as food sources and certain crops such as cassava are also used in ritual. Equally important is the perception by Hopkins women of household plots as their most reliable means of economic security and independence.

FEDERALISM, FORMALISM AND THE GEOGRAPHY OF REGULATION by Nicholas K. Blomley, Department of Geography, Simon Fraser University, Burnaby, British Columbia, CANADA V5A 1S6.

This paper will seek to address a central question of state regulation, that being the appropriate locus -local or central - of state intervention and legal interpretation. Should the power to make and define law be vested in a local community, or with a centralized federal agency? Using recent U.S. case law, this analysis will seek to challenge a central formalist conception that assumes that this dilemma can be decided in an objective and 'removed' fashion. Far from constructing an a-contextual interpretation, the judiciary appear to approach the issue from fundamentally opposed positions, embodying contending visions of the geographic constitution of political action. These interpretations are, it is suggested, symptomatic of deeply rooted ambivalences within the state apparatus - and, indeed, within civil society - concerning place and law. It is suggested that formalism and federalism, far from seamless discourses, appear beset by powerful internal tensions that reflect the confrontation of space by the state.

These ambivalences are, however, of importance, given the powerful effect that competing judicial conceptions of place and power can have in structuring law to the disadvantage of certain localities and working populations. The implications of this will be briefly commented on.

LANDSCAPE EVOLUTION AND PREHISTORIC SETTLEMENT ALONG THE COLORADO AND CONCHO RIVERS OF WEST TEXAS by Michael D. Blum, Department of Geography, University of Texas at Austin, Austin, Texas 78712.

Geoarchaeological investigations along the Colorado and Concho Rivers of West Texas have produced a landscape evolution model that provides a contextual framework for interpretation of the archaeological record. Five fluvial landform-sediment assemblages have been differentiated on the basis of soil-geomorphic and stratigraphic relations. Dissected early to middle Pleistocene(?) terrace remnants cap many upland areas, and are preserved in this erosional landscape because of their strongly indurated petrocalcic horizons. Two late Pleistocene terraces are widespread, and are characterized by soils with strong argillic and calcic horizons. Fluvial activity during the culturally relevant time period is represented by an extensive Holocene terrace and underlying valley fill, as well as the modern incised channel and narrow floodplain. Stratigraphic relationships and radiocarbon ages indicate the Holocene valley fill records periods of early to middle Holocene (ca. 10,000 to 5000 BP) and late Holocene (ca. 4600 to 1000 BP) floodplain construction that are separated by a buried soil profile with cambic to incipient argillic B horizons, and weakly developed calcic horizons, whereas the modern incised channels and narrow floodplains are products of the last millennium. Eolian sand sheets with multiple paleosols overlie upland bedrock dominated terrains, Pleistocene terraces, and in some cases the Holocene valley fill along the Colorado River.

The early to middle Pleistocene terrace remnants and late Pleistocene terraces have been stable features in the landscape, and therefore available for prehistoric settlement through the culturally relevant time period: hence, archaeological sites from all time periods occur at the surface, and may represent discrete episodes of activity to longer term palimpsests that were repeatedly used over millennia. Archaeological sites within the early to middle Holocene and late Holocene fills represent short-term, probably task specific utilization of dynamic constructional floodplain surfaces and their associated resources. By contrast, sites that occur along the buried soil profile developed in the early to middle Holocene fill represent cultural activity on stable, stream proximal terrace surfaces, and range from discrete episodes of activity to longer term palimpsests that may span much of the 3000-3500 years of subaerial exposure. The Holocene terrace surface has been a stable feature in the landscape for the last 1000 years, and contains Late Prehistoric cultural remains. Archaeological records from all time periods occur within eolian sand sheets, or between eolian sands and subjacent fluvial deposits, and represent utilization of slowly aggrading upland settings.

THE RAILWAY INTERRELATIONS OF THE UNITED STATES AND CANADA: A RE-EVALUATION OF THE 1936 WILGUS STUDY by C. W. Boas, York College of PA, York, PA 17403

A twentyfive volume series of studies of the relationships of the United States and Canada was published under the direction of the Carnegie Endowment for International Peace during the years 1932-44. The studies were intended to cover the entire field of political, economic and cultural relations of the two nations. The task of analyzing the railway interrelationship was assigned to W. J. Wilgus, civil engineer, who completed his study in 1936. The bulk of Wilgus' research is a detailed analysis of the geographic distribution of cross border rail links which he designated as "gateways".

This paper compares the present day linkage with the 1936 pattern. The decline in number of facilities and linkage points, changes in ownership and control and the changing nature of passenger and freight service are illustrated with maps and statistical tables.

The reduction of passenger service has been paralleled by a decline in local freight loading and delivery. Long distance freight service continues between major interchange points; passenger service is carried out by Amtrak on a minimal schedule. The greatest loss of linkage points has been in the area east of the Great Lakes; the pattern west of Duluth is static. Recent corporate restructuring of services east of Montreal may presage further service reduction in that region.

SMALL WORLDS OF INFLUENCE: CITATION STRUCTURES IN CONTEMPORARY GEOGRAPHY by A.R. Bodman, Department of Geography, University of Vermont, Burlington, Vermont 05405.

Scant attention has been paid within geography to the degree to which the research agenda for the discipline is set by a few highly influential authors. Following the lead of Whitehand (1985) and Wrigley and Matthews (1987), this paper explores the small worlds of geographic influence revealed through citation analysis. The data are drawn from the Social Sciences Citation Index and the Science Citation Index and the initial sample includes geographers from the U.S.A, the United Kingdom, Canada and Australia. Citations between 1984 and 1988 are examined. For each country, the distribution of citations is, as expected, heavily skewed. Overall, fewer than a hundred authors account for approximately half of the total citations. The ranks of these highly influential authors have changed considerably in the past decade, as geography's 'baby boomers' have achieved prominence. These researchers continue to be concentrated in a small number of specialties, though less heavily than in earlier studies. Likewise, they are the product of a relatively small number of departments and they tend to be clustered in a few universities. There are substantial linkages between these highly cited researchers. In aggregate, their influence is divided quite evenly between core geography publications and inter-disciplinary journals. Rarely do they exert substantial influence in core journals in cognate disciplines.

THE STUDY OF RACE AND RACISM IN BRITISH GEOGRAPHY : A NEW GEOGRAPHY OF RACISM ? by Keith D Bolling, Department of Geography, Syracuse University, Syracuse, NY 13244.

Since the earliest period of post-war immigration to Britain, geographers have shown interest in racial and ethnic minorities. Spatial patterns of different groups have been described and mapped, levels of residential segregation have been calculated, and patterns of ethnic concentration and deprivation have been highlighted. Such work has defined the boundaries of ethnic and racial space and has thrown light on the characteristics of social relations between different groups in British society. In recent years, however, much of this work has been criticized for its excessive focus on empiricism and for failing to provide any sort of broader societal analysis to issues of race and racism. Critics have urged geographers to build upon their past interests and to focus on the wider structural implications of the spatial patterns they have been mapping and measuring. Recent evidence suggests that some change in this direction is taking place and that a new 'geography of racism' is beginning to emerge in Britain. The purpose of this paper is to briefly trace the development of studies on race and racism within academic geography in Britain. Both the positive aspects of past work and its inadequacies are considered. This is followed by an examination of recent trends in the discipline which have seen a growing awareness of the contribution geographers can make to issues of race and racism. The paper considers whither a new 'geography of racism' can be developed as a viable field of enquiry and how such a geography will differ from what has gone before.

LAND RECLAMATION AFTER SURFACE MINING IN THE USSR: PRELIMINARY OBSERVATIONS by Andrew R. Bond, V.H. Winston & Son, Inc., Silver Spring, Maryland 20910, and Kurt Piepenburg, Department of Geography, Carthage College, Kenosha, Wisconsin 53141.

This paper surveys economic, political, and legal factors involved in decisions to reclaim surface-mined land in the USSR, with particular emphasis on coal and iron ore, two of the most economically significant minerals extracted by surface mining methods. It presents estimates of the extent of surface mining and of areas reclaimed for agricultural and other uses, which provide at least a crude picture of the dimensions of the reclamation problem. The economic, political, and legal factors addressed include: changing ratios of surface to underground mine production, a price system which undervalues mineral raw materials relative to finished products, Gorbachev's economic reforms (especially khozraschet and samofinansirovaniye), increasing overburden-to-useful-product ratios in surface mining of coal, and fragmentation of jurisdiction over land management, mining, and environmental protection activities. Relevant reclamation laws (1968 USSR Land Law, 1976 Decree on Land Reclamation) are summarized and the ways in which they are interpreted are discussed. Economic pressures to expand land-consumptive and environmentally disruptive modes of mineral extraction, ministry and enterprise incentives to achieve normative rates of economic return from state investments, and current uncertainty regarding the ultimate division of environmental protection functions within the Soviet government do not appear to promote more effective reclamation efforts.

Landscapes of change: masculinity and femininity in the city

Liz Bondi, University of Edinburgh, Scotland

This paper aims to contribute to feminist analyses of contemporary urban change by means of a critical engagement between recent geographical writings on urban landscapes and feminist interpretations of urban form. Within the former, places and spaces are being reinstated as central to human experience and as capable of capturing, embodying, transforming and yielding up important aspects of that experience. Yet this literature remains largely silent about gender and sexuality as facets of human experience imprinted on these landscapes. Elsewhere, feminist geographers have explored the interplay between the social construction of gender and the evolving urban environment, demonstrating how masculinity and femininity are both expressed in and constrained by the spatial patterning of human life. But within this work, concepts of landscape have received little attention, leading to an overly limited view of the ways in which the environment is 'gendered'. From this critique the paper proceeds to explore ways in which contemporary forms of urban change might express, reinterpret or resist the binary opposition man/woman.

AIR COMMUTING FOR NORTHERN NATIVES: REAL OR IMAGINED IMPACT? by Robert M. Bone, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0.

Three isolated uranium mines in northern Saskatchewan are using a system of air commuting for their workers. Some 15 years ago, the company operating the oldest mine, Rabbit Lake, selected an air commuting system over the alternative solution - that of establishing a settlement near the mine site. The two other mines, Cluff Lake and Key Lake, also use an air commuting system to obtain their supply of labour.

While most of the workers come from southern cities and towns, approximately one-third live in northern centers. For these workers, there is a separate 'northern' air commuting system, which links many small and isolated communities. The majority of these northerners are either Metis or Indian. Given the high wages associated with the mining industry and the low wages found in native communities, the wages of the uranium miners should have a substantial effect on the total wages earned by all residents of these centers. Yet, when the potential income impact was compared with actual community income figures, the expected rise in community wages was not confirmed. The unresolved question is why?

URBANIZATION IN THE BAHAMAS by Thomas D. Boswell and James E. Biggs, Department of Geography, University of Miami, Coral Gables, Florida 33124.

The processes of urbanization in the Bahamas are different from some of those that have taken place elsewhere in the Caribbean. Unlike most of the larger islands, but similar to some of the smaller ones, the history of urbanization in the Bahamas has been the history of one city, Nassau, until the Freeport-Lucaya complex was initiated in 1955.

Freeport-Lucaya is the only city in the Caribbean that has been built for the express purpose of promoting both tourism and manufacturing. One consequence of its development is that it has siphoned off much of the internal migration in the Bahamas that otherwise would have been directed toward Nassau. As a result, Nassau is the only primate city in the Caribbean whose metropolitan population has not grown at least partly by internal migration since 1960. Clearly, this has been an advantage for this city as its growth has been considerably slower than it would other wise have been. Because of this, the city has been better able to accommodate its population growth, as is evidenced by the fact that there are almost not squatter settlement on New Providence, besides a few hard-to-find small Haitian settlements.

This paper focuses on the following topics in the Bahamas: the demographics of urbanization, internal migration and immigration, changing labor force characteristics as a consequence of urbanization, and crime.

LOCATIONAL CHANGES IN CANADIAN MANUFACTURING: 1977-1983 by Howard A. Botts, University of Wisconsin-Whitewater, Whitewater, Wisconsin 53190 and J. Brady Foust, University of Wisconsin-Eau Claire, Eau Claire, Wisconsin 54701.

The space-economy of North America has undergone a major transformation in the location and structure of manufacturing since the late 1950's. Substantial research has focused on the "Sunbelt/Snowbelt" shift in the United States, but relatively little work has been done on the changes in the locational structure of the Canadian industrial base. While structural changes in the Canadian economy have been documented, the need exists to carefully examine the locational changes at a detailed level. The purpose of this research project is to examine changes in the pattern of Canadian manufacturing using the most recent available data. First, the locational patterns will be considered at the macro scale (provincial level) to determine the industrial mix (structure) of manufacturing. Secondly, patterns of industrial location and their relative over or under representation, are examined at the detailed census division level for all ten provinces. Results of this study suggest regional disparities in Canada, when measured through detailed spatial analysis at the census division level, are strong and persistent.

A GENETIC PARADIGM FOR LANDSCAPE AESTHETICS by Steven C. Bourassa, Graduate Program in City and Regional Planning, Department of Geography and Planning, 226 Johnson Hall, Memphis State University, Memphis, Tennessee 38152.

This paper attempts to resolve the conflict between biological and cultural explanations of aesthetic behavior that is evident in the geographical literature on landscape aesthetics. The paper combines biological and cultural bases for aesthetics in a comprehensive paradigm for research in landscape aesthetics. This paradigm relies on Vygotsky's genetic, or developmental, approach to understanding the human mind and human behavior. Vygotsky's genetic method leads to the identification of three fundamental processes of development: phylogenesis, sociogenesis, and ontogenesis. These correspond to three modes of existence—the *Umwelt*, *Mitwelt*, and *Eigenwelt*—identified phenomenologically by the existential analysts. These in turn correspond to three modes of aesthetic experience: biological, cultural, and personal.

The interrelations of the three modes of aesthetic experience are discussed, with particular emphasis on the distinction between the biological and the cultural modes. It is concluded that each mode has distinct qualities which justify its separate inclusion within the paradigm.

Finally, the three modes are characterized as sets of aesthetic constraints and opportunities, labelled *laws*, *rules*, and *strategies*, respectively. Important research directions in landscape aesthetics involve identification and explanation of these constraints and opportunities.

THE INVENTION OF AMERICAN TRADITION by M.J.Bowden, Clark University, Worcester, Mass, 10610.

To justify the dispossession of the Indian in America colonials portrayed Indians as wild animals who did nothing to 'improve' the land. This, despite obvious evidence of Indian agriculture and burning. The seventeenth-century tradition of the indolent Indian had as corollary the notion of the new found land as a 'hoary' wilderness, but it was not until the nineteenth century that romantic nationalists formalized this into the tradition of pre-Columbian America as pristine wilderness. From primeval forest to great American desert each environment encountered became far tougher in retrospect than it ever was in reality. Encounter with this overpowering environment yielded the tradition of the larger-than-life American hero: Paul Bunyan, cowboy, and latter-day saint. So strong was the environment of tradition that settlers who came in groups from culturally distinct English regions were immediately stripped of their English regional distinctions and even homogenized Englishness. Contradicting this tradition, romantic nationalists bent on establishing New England's uniqueness and the purity of its English connection proclaimed, as cant, that the Yankee villages of the Golden Age were cultural transplants of English ways. The romantic nationalists did not set out to subvert history and geography and invent traditions. They took 'truths' that were 'in the air' and made them literary epics. Despite a century of professional scholarship, many of these invented traditions are treated unquestioningly as paradigms.

PROGRESS IN APPALACHIA? UNEMPLOYMENT IN APPALACHIAN LABOR MARKETS 1966-1989 by J. Bowen, University of Kentucky, Lexington, Kentucky, 40506.

In this paper, I examine monthly unemployment rates in fourteen Appalachian cities over the period November 1966 to March 1989. Historically, much of Appalachia has been characterized by "boom and bust" cycles of prosperity. These cycles reflect both the region's underdevelopment and its particular industrial structure. In this research, I consider the extent to which Appalachia has progressed towards national economic development standards. I have analyzed trends in the sensitivity of local unemployment rates to national business cycles. Economic development should incorporate both the integration of isolated, relatively insensitive markets into the national economy as well as the diversification of historically hypersensitive markets. Thus, changes in unemployment sensitivity may be used as one measure of economic development. Using regression analysis, I have estimated the sensitivity of local unemployment rates to national unemployment trends for each city. The parameter describing this relationship was then expanded as a function of time to reveal any long term trends in sensitivity. During the last twenty years, most of the fourteen labor markets have become more sensitive to national business cycles. In labor markets which were initially insensitive, this trend may reflect economic development. However, sensitivity has also increased in some markets which were initially hypersensitive. In these cities, the "boom and bust" cycles of prosperity are likely to continue.

DESERT LAND FOR SALE by Marshall Bowen, Mary Washington College, Fredericksburg, VA 22401.

In the first years of the twentieth century, promotional firms took advantage of a nationwide Back-to-the-Land movement, a growing interest in irrigation, and advances in dry farming by acquiring millions of acres of marginal land in the Great Basin, and offering it to prospective farmers. Marketing strategies employed by these firms in northwestern Utah and northeastern Nevada included the dissemination of exaggerated claims through brochures and newspapers, personalized sales pitches, and the provision of on-site benefits in the form of new towns, demonstration farms, and land that had already been cleared. Hundreds of settlers responded to these inducements, but most of them departed after a few years, leaving behind scarred landscapes and fading memories of promoters who had already moved on to more promising fields of investment.

MAPPING THE AIDS EPIDEMIC IN CALIFORNIA by William Bowen, Department of Geography, California State University Northridge, Northridge, California 91330.

The first cases of what was later to be known as Acquired Immunodeficiency Syndrome (AIDS) were reported to the federal Centers of Disease Control (CDC) by physicians from Los Angeles County. Between October 1980 and May 1981, five previously healthy young men were diagnosed with Pneumocystis carinii pneumonia, an opportunistic infection previously recognized almost exclusively among patients with severe underlying immunosuppressive diseases. As of May 31, 1989 the CDC had reported a cumulative total of 97,193 AIDS cases and 56,468 known AIDS deaths in the United States. As of April 30, 1989, 19,868 cases and 12,192 deaths had been recorded in California.

This paper will present in great detail the geography of the epidemic in California. The principal tool of analysis will be the map. A series of maps will portray the temporal and spatial characteristics of the disease as it has been reported at county, ZIPcode, and census tract levels. Particular attention will be given to Los Angeles County [7,011 cases - 4,473 deaths (4/30/89)] and San Francisco [5,963 cases - 3,801 deaths (4/30/89)]. Several maps will be distributed.

PROFESSIONAL LABOR MARKETS AND R&D FACILITY LOCATION: THE EFFECT OF CITY SIZE by Susan L. Bradbury, Southwest Missouri State University, Springfield, Missouri 65804.

R&D is generally regarded as a large city activity. However, several researchers have identified a decentralization trend occurring among white collar functions, such as corporate headquarters and research laboratories. Corporate research facilities are shifting out of the larger metropolitan areas to smaller city locations. R &D facilities are dominated in their locational decision by their ability to attract and retain qualified scientists and technicians and, this decentralization trend is largely regarded as a result of R&D facilities following the locational preferences of their professional and technical workers. The results of a nationwide study demonstrate that quality of life and city size are important locational determinants to professional workers and R & D facilities.

SCHOOL PERFORMANCE INDICATORS: THE EFFECTS OF NEIGHBOURHOOD AND PARENTAL CHOICE. By Michael Bradford, Department of Geography, University of Manchester, M13 9PL. England.

There has been recent academic and political interest in the effectiveness of schools, with the New Right, among others, advocating the introduction of school performance indicators. In Britain the increased power of parental choice (Education Reform Act 1988) makes such indicators potential marketing devices, as schools move from a predominantly allocative system of pupil placement to one based on market forces.

The most easily available indicators are examination results and the future results of national tests at 7, 11 and 14 that will accompany the introduction of the National Curriculum. There has been much research on the need to adjust for the effects of prior attainment and social class on such results, and the importance of measuring at the individual rather than the school level. Such research, however, ignores the geography of school catchments. The local residential environments within a school catchment area have been shown to influence attainment over and above other individual and household variables. The paper discusses these important effects on school performance indicators both at the individual and school level. It also considers the effects of parental choice on attainment, its relations to the local residential environment and its consequent potential influence on school performance indicators.

The effects of the local residential environment and parental choice make school performance indicators poor measures of school effectiveness and misleading guides for parental choice. The probable impacts of their use is considered for both school and social systems.

PERESTROYKA AND REGIONAL GEOGRAPHY by Michael J. Bradshaw, School of Geography, The University of Birmingham, Edgbaston, Birmingham, England, B15 2TT

This paper introduces two sessions which explore the geographical dimensions of Perestroyka. The paper examines the relationship between the "New Regional Geography" and Perestroyka, and discusses the spatial implications of Soviet reform.

Calls for a "new" or "reconstructed" regional geography derive from a theoretical imperative that seeks to determine regional and local impacts and responses to larger-scale economic forces. The theoretical and empirical origins of this new regional geography lie in studies of industrial change under capitalism. So far little attention has been paid to the impact of these international forces upon non-market state socialist economies. Current events in the socialist world suggest the need for a new regional geography that is truly global in application.

This paper carries the argument forward by examining the geographical implications of economic restructuring in the Soviet Union. I suggest that Perestroyka is, in part, a response to changes in the global economic system. As such it is changing the relationship between peoples and places within the Soviet Union. The impact of reform is not felt uniformly across the landscape; some peoples and regions stand to benefit, while others may loose.

I conclude by suggesting an agenda for a "New Regional Geography" of the Soviet Union.

PHYSICAL AND BOUNDARY LAYER CLIMATOLOGY by Anthony J. Brazel, University of Delaware, Newark, Delaware 19716 and Arizona State University, Tempe, Az 85287

Geographers have made significant contributions to boundary layer climatology in diverse environments, ranging from urban canyons to deserts, to ice, snow, and alpine environments. Many contributions came from geographers R. Barry, J. Davies, J. Hay, F. Hare, M. Marcus, J. Mather, D. Miller, R. Muller, T. Oke, S. Outcalt, J. Rayner, and W. Terjung in the areas of moisture and energy budget analyses, reflecting Thornthwaite's "The Task Ahead". Many physical geographers have followed their lead and maintained similar paradigms.

In the future, Boundary layer climatology will hold a critical place in developing theories of the entire earth-atmosphere system. The linkage with general circulation models, for example, will continue to be an important emphasis for boundary layer climatologists. The field will not be an isolated area of investigation, but a challenging interdisciplinary endeavor. It will have to include, for example, increased degrees of sophistication in treating the influences of synoptic and dynamic forcing.

IN SEARCH OF A QUALITY URBAN HOUSING ENVIRONMENT FOR WOMEN by Myrna Margulies Breitbart, Hampshire College, Amherst, Massachusetts 01002

This paper examines the efforts of the Women's Development Corporation in Providence, Rhode Island to design and develop rental housing for low income women and their children. It describes the participatory design process which preceded the construction of units and then discusses the results of a post- occupancy survey which the author conducted in 1987 with a diverse multi-racial group of tenants. Its purpose was to assess how well the new housing was meeting the shelter needs of its occupants and to learn more about those elements that contribute to a quality living environment for them.

Results document the important ways in which access to affordable, well-designed housing enables low income single parents and their children to alter their personal lives in positive directions. The survey also indicates the extent to which tenant assessment of the positive and negative features of their current housing is determined by many interpenetrating aspects of design at several environmental levels: the apartment, building, neighborhood, and city as a whole. Finally, the survey is used to set an agenda for future efforts by community-based organizations to develop single parent rental housing in an urban context. Goals here include the expansion of criteria for assessing non-profit housing strategies (e.g. scattered site vs. concentrated development) so as to weigh more heavily the needs of children and adults to explore and socialize freely within larger residential neighborhoods.

RETAIL AGGLOMERATIONS: SUBURBAN RETAIL EVOLUTION IN MINNEAPOLIS-ST. PAUL by David P. Brennan, College of St. Thomas, 2115 Summit Avenue, St. Paul, MN 55105.

The nation has undergone a retail revolution during the past four decades. Suburbanization has led to the development of regional malls and adjacent retail areas that often exceed the central business district in physical size, offerings, and sales.

This paper examines the evolution of retailing around eight regional malls in suburban Minneapolis-St. Paul. The size, appeal, and sales trends of each agglomeration is examined and compared to uncover systematic processes causing the change.

The original malls provided the catalyst for real estate developers and retailers to locate nearby. The amount of peripherial growth depends on the appetite of developers, market size and growth, ease of access, availability of developable land, city planning and zoning, the interest of major anchor-type retailers to expand, and the size, proximity and strength of competing malls. In addition, the growth of discount department stores, the emergence of specialty stores, rapid expansion of national traditional department stores, and recent growth of off-price retailers have led to substantial growth in and around primary malls.

Retail agglomerations, while continuing to grow, suffer from a lack of overall physical planning, unified merchandising, and coordinated promotional efforts. These limits, along with the desire of certain department stores and developers to go national, may give rise to mega malls in major metropolitan areas.

THE EFFECT OF COLOR ON THE PERCEPTION OF MAP SCALE by Cynthia A. Brewer, Department of Geography, Michigan State University, East Lansing, MI 48824.

Previous research has shown that variation of single-color design elements is successful in encouraging map readers to recognize differences in scale among maps in a series. The author's purpose was to investigate the effect of color value and chroma on the perceived scale of reference atlas maps with hypsometric tints. Test-map elevations were represented using a constant set of four hues in three schemes with different value and chroma characteristics: subdued (all elevation tints were light and low chroma), strong (all tints were dark and high chroma), and high contrast (value ranged from light to dark and chroma ranged from low to high). Test-map linework was also shown in either strong or subdued colors. Twenty-two subjects were presented with nine test pairs and asked to decide whether the two maps in each pair were the same scale or which map was smaller in scale ("shows more earth area"). Chi-square analysis of the subjects' nominal responses revealed that differences in elevation-tint strength or contrast and differences in linework strength all produced a significant increase in the perception of differences in map scale. No significant direction for these perceived differences was in evidence. The results indicate that differences in value and chroma between atlas maps of a series will effectively alert map readers that a difference in scale exists, but more specific expectations for the graphic communication of scale with color are overly optimistic.

SPATIAL DIMENSIONS OF THE FLORIDA CITRUS CANKER ERADICATION PROGRAM, 1984-1988 by James Brey, Univ. of Wisconsin Centers, 150 E. Gilman, Madison, WI 53706-6600.

Rebuilding the Florida citrus industry in the wake of serious tree mortality caused by freezes in the 1980-1985 period was dependent upon the supply of budded young nursery trees. At just the time the replants were most desperately needed, plant pathologists identified what they thought was citrus canker in over twenty major nurseries throughout the state. 20 million resets were put to the torch to eliminate the threat of a canker epidemic, seriously delaying the restoration of productive capacity and ruining many individual citrus enterprises. Subsequent study showed that the disease present in the nurseries was not the dreaded canker. The hundreds of millions of dollars loss to the nurseries and even greater amounts of indirect loss incurred by other segments of the industry could have been prevented.

This paper explores the interesting spatial component of this episode and shows the value of spatial analysis in assessing situations where location, movement, and environmental suitability are key elements. Data obtained from Florida Citrus Canker Project documents and interviews with canker experts, nursery operators and growers suggest that had a serious spatial analysis of the outbreak been undertaken at the time the disease was first discovered it is likely that the situation would have been perceived as far less threatening.

ANNUAL FLOOD CHARACTERISTICS IN ARGENTINA AND ENSO EVENTS. by P. B. Bright and P. R. Waylen, Department of Geography, University of Florida, Gainesville, FL 32611.

The Gumbel and Generalized Extreme Value distributions are used to investigate the frequency characteristics of the annual flood series from the entire length of the Argentine Andes. The Gumbel distribution is found to be inadequate in many cases where the snowmelt flood generating process appears to operate at a different magnitude in some years of record. It seems that the flood frequency characteristics in any year are partially dependent upon ENSO activity in the South Pacific. The study indicates that this influence is not constant over the length of the study area. Rivers in the south and north display either negative or no correlation with ENSO events; while rivers in the central latitudes show a positive correlation with ENSO events.

SALINITY IN ANCIENT AGRICULTURAL ANTHROSOLS OF SOUTH ARABIA by Robert Brinkmann, Department of Geography, University of Wisconsin-Milwaukee, Milwaukee, WI 53201.

An analysis of the base content of soils developed on thick sequences of sediment derived from Pre-Islamic irrigation techniques in the Yemen Arab Republic aids in recanting the theory that salinization of the soil resource was instrumental in the decline of Sabean culture. Two-hundred and fifty stratigraphic samples at seven different localities of ancient irrigated fields near Wadi al-Jubah were analyzed for the concentration of available potassium, calcium, magnesium, and water soluble salts. When compared with the salt tolerance level of crops cultivated during ancient occupations, only ten of the soils proved to be detrimental to plant growth. Aeolian silt, as well as sand, silt, and clay deposited by irrigation waters were constant additions to the fields. These sediments provided non-saline parent material and diluted any harmful effects from salinization due to irrigation. It is suggested that other factors, both environmental and cultural, led to the decline of ancient South Arabia.

PALEOCLIMATES by Waltraud A.R. Brinkmann, Department of Geography University of Wisconsin, Madison, WI 53706.

The history of paleoclimatology began less than two centuries ago when some scientists started to recognize evidence of a past ice age. The documentation of the nature and chronology of past climates--using proxy indicators--has until recently been descriptive, site-specific, and hampered by discontinuities in the land record. This is now rapidly changing due to the development of 'transfer functions' and a variety of dating techniques, and to the growing need to verify global atmospheric circulation models of past climates.

Short-term climate variability was generally disregarded until instrumental records long enough to document their existence had been collected and the sensitivity of a growing world population to short-term climate variations became obvious. The focus of most of the research is still on changes in the mean; changes in variability--such as changes in the frequency of occurrence of extremes--through their impact on agriculture, water supplies, etc. are, however, of equal importance to human affairs. The growing interest in the identification of anticipated changes in the greenhouse effect is leading to a renewed interest in the accuracy and spatial coverage of the instrumental record.

PLANNING FOR SCENIC PARKWAYS: INSTITUTIONAL BARRIERS TO DEVELOPMENT by ROBERT S. BRISTOW, Department of Geography & Regional Planning, Westfield State College, Westfield, Massachusetts 01086 and M. PATRICK CURRY, Office of Economic Development, Southern Illinois University, Carbondale, Illinois 62901

The Shawnee View Parkway was proposed in 1987 as a way to address the economic and environmental concerns that halted earlier scenic highway projects in Southern Illinois. The primary objective of this paper is to critically evaluate the factors that influence the potential development of this scenic parkway and identify the institutional barriers. A review of scenic highway development plans is provided. Interviews conducted indicate the project would not be feasible because of financial viability and environmental opposition. In addition, neither environmentalists nor tourism development groups have a good understanding of each other's perspectives. It is recommended that development of any project for tourism must have all concerned groups identified and brought into the planning process. A strategic plan for potential development is offered as a means for achieving tourism goals.

SURVEY OF HAITIAN ROOT AND TUBER CROPS: CULTURAL LINEAGE, FUTURE POTENTIAL by Edward C.Britton, Louisiana State University, Baton Rouge, LA 70803

Domesticated crops serve as fascinating integrators of man's cultural heritage and his physical environment. The complex of root and tuber crops reflects the unique geographic milieu of Haiti in terms of both cultural origins and present-day challenges to survival. This study surveys the remarkable variety of starchy root and tuber crops produced in Haiti today. These plants span a broad range of environments, and command a place of prominence in the panoply of all food crops grown there. Haiti ranks among the foremost producers of commercial root and tuber crops in Middle America, and non-commercial production is even more important to Haitian subsistence. The fact that Haiti is culturally pre-disposed to both production and consumption of root and tuber crops offers hope for the future of a country shackled by hunger and poverty, as these crops are among the world's most promising in terms of photosynthetic efficiency and productivity.

DEPRIVATION AND SOCIAL UPGRADING IN CANADIAN INNER CITIES by Michael Broadway, SUNY Geneseo, Geneseo, New York 14454.

Since the early 1970s, Canadian inner cities have experienced extensive redevelopment and housing renovation which has resulted in social upgrading in selected inner city neighborhoods. This process of middle-class settlement has been attributed to structural changes in the Canadian economy and in particular the expansion of the quaternary sector in city centres, which in turn has created a demand for middle class housing in the inner city. Accompanying the growth of the quaternary sector has been a decline in non-quaternary employment; it is suggested that this decline has resulted in increasing levels of inner city deprivation. The purpose of this paper is to examine this proposition for the inner cities of Vancouver, Edmonton, Regina, Winnipeg, Ottawa-Hull, Toronto, Halifax and St. John during the period from 1971-1981. Preliminary evidence supports the existence of a polarization process, whereby economic deprivation levels have increased along with the influx of middle-class settlers.

REVOLUTION AND SOCIAL MOVEMENTS: THE SANDINISTA APPROACH by John Brohman, Department of Geography, Simon Fraser University, Burnaby, British Columbia V5A 1S6.

During its early stages, the Nicaraguan revolution was largely rural based. However, in its latter stages the revolutionary movement developed a decidedly urban orientation. Instead of being proletarian in a strict sense, the urban struggle developed an amplified popular character that expressed the uneven nature of capitalist growth and the resultant peculiarity of class dynamics in Nicaraguan society. The urban component of the revolution mirrored the recent growth of new leftist social movements in many of Latin America's large urban areas, in that it was formed by a diverse group of social sectors which were focussed on the popular barrios as centers of reproduction rather than on workplaces as centers of production. The historical program of the FSLN contained both a Marxist component (i.e., analysis of structural contradictions inherent to underdeveloped peripheral capitalist societies, vanguard revolutionary strategy) and a more home-bred Sandinista component (i.e., exertion of national sovereignty, anti-imperialism, popular democracy) which together addressed a complex web of developmental issues and problems of broad concern to a diverse spectrum of classes and social groups.

SMALL CITY / BIG POLITY: ECONOMIC DEVELOPMENT IN US STATE CAPITALS by Ray Bromley, Department of Geography and Planning, State University of New York at Albany, Social Sciences 147, Albany, NY 12222.

The United States has a unique concentration of government activity in secondary cities, with both the federal capital and two-thirds of the state capitals being located away from the principal cities of the territories that they govern. This paper examines the economic development environment of five of the principal state capitals and "government towns" in the US: Albany, Austin, Lansing, Sacramento and Tallahassee. It focuses on the relationship between the business community, local governments, state government and universities located in secondary cities which are also the capitals of major states. Particular attention is given to the forms of government-business-university collaboration and conflict which occur in such settings, and to the extent to which government activity is a stimulus or an impediment to entrepreneurship. Consideration is also given to the emergence of high-tech R&D concentrations in government towns, and to the reasons why major state capitals have experienced unusually rapid economic and demographic growth over the last 20 years. Finally, the impacts of government restructuring and of changing office and communications technologies are reviewed, examining the potential for reducing state government workforces and relocating government activities away from the capital city.

GEOGRAPHIC PATTERN OF U.S. NEWSPAPERS, 1810 TO 1840 by Susan R. Brooker-Gross, Department of Geography, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061.

While newspaper distribution and content have been used in geographic research as indicators of the urban system, we know relatively little about the origins of newspapers, and the relationship of their emergence to the economic and social growth of urban centers and regions. With the emphasis in journalism history on the political function of newspapers, political needs have been thought to be the impetus for the creation of newspapers. Recent research on the late nineteenth century frontier is disproving this assumption, so a broader hypothesis of economic growth and population growth serves as a model for the examination of the early nineteenth century in the eastern United States.

This paper examines the spatial patterns of newspaper from 1810 to 1840, as they arise out of newly growing areas and contribute to that growth. I examine variations in populations sizes per newspaper (thresholds) by county, using counties as a surrogate for circulation area. Average population for counties with newspapers is compared to those counties without newspapers, and to statewide aggregated threshold populations. Variations in these results point to regional and temporal differences in the supposed function of newspapers. In both 1810 and 1840, established urban centers have relatively high thresholds, while newly settled areas are noted for low threshold populations. By 1840, southern rural states have even higher threshold populations than urban areas, raising questions about the distribution and use of newspapers in smaller towns within the South and rural areas generally.

DEFORESTATION IN PENINSULAR MALAYSIA AND BORNEO by Harold Brookfield, Australian National University.

By the mid-1990s half the forests of Peninsular Malaysia, which once covered almost all the Peninsula, will have been cleared and converted mainly to agricultural use. Much of the rest will have been logged. The island of Borneo is already the source of about half of the tropical hardwood timber entering world trade, and its forests are also undergoing rapid conversion to agriculture. This paper surveys the modern history of change and its reasons, briefly reviews the environmental impact and that on the rural economy.

The problems are not those of the Amazon, but a new environmental adaptation is yet far from being achieved. Shifting cultivators are under severe pressure, but many resettled new farmers also face an uncertain future. Attempts to develop a 'sustainable' timber industry remain essentially experimental. Political pressures to use forest and land resources as part of national development strategies have been compelling, and the pace of change is such that the experience needed to establish a new people-environment system is having to be compressed into a very short period of time. None the less, the history of environmental use can yield lessons of importance.

MASS MOVEMENT PROCESSES ON SLOPES : THE ROLE OF PEDOGENESIS AND HYDROLOGICAL CHANGES OVER GEOLOGICAL TIMESCALES by S. M. Brooks, Department of Geography, Downing Place, University of Cambridge, CB2 3EN, U.K.

Occurrence of shallow landslips on slopes becomes increasingly likely as pedogenesis proceeds. The soil properties which govern the mass movement processes are a) increasing horizon thicknesses, b) changing particle size distributions, and c) changing bulk densities. Previous studies have linked the increased likelihood of mass movement to changing values of the angle of internal friction coupled with a straightforward rise in the water-table to the ground surface. However, the three soil properties listed above change in a complex way, through different combinations of weathering and translocation, which calls for a reassessment and reevaluation of the complexity of the hydrological processes which lead to mass movement. Since failure can take place at any degree of relative saturation within the soil, the supposed mechanisms centre around varying rates of moisture flux within the soil, and consequent changes in suctions and pore water pressures.

A combination of field, laboratory and computer modelling techniques is shown to be an effective means of investigating the role of hydrological change in initiating mass movement. Firstly, the pedogenetic processes are studied for a podsol chronosequence in Scotland. Secondly a series of laboratory tests enables quantification of the important hydrological changes for a variety of other soil types. Thirdly, computer modelling is used to investigate the complex hydrological mechanisms leading to failure, and also to assess the way in which the likelihood of mass movement changes over geological time for different slope angles and soil types.

EVOLUTION OF PUSH FACTORS CONTRIBUTING TO OUT-MIGRATION FROM EL CERRITO, NEW MEXICO by Brock J. Brown, University of Colorado at Boulder, Boulder, Colorado. 80309-0260.

World War II era out-migration from small villages such as El Cerrito in the Hispano Homeland of Northern New Mexico has been the topic of recent research by Richard L. Nostrand. Both push and pull factors contributed to the out-migration. This paper investigates the historical evolution of the push factors that would culminate in the migration from the village of El Cerrito, New Mexico.

A review of the historical literature suggests that the roots of the push factors began to develop shortly after initial Hispano settlement. Push factors, ranging in scale from local to international, included environmental degradation, differing cultural perspectives between English and Spanish laws, commercial markets and wage earning opportunities, and global economic decline in the 1930s. The combined effect at the local scale was deterioration of the subsistence economic infrastructure and disappearance of economic opportunity.

AN EXAMINATION OF A DISTANCE DECAY FUNCTION RELATING AIR QUALITY TO POWER PLANT SITES by Chris Brown, Dept. of Geography, MSU, East Lansing, Michigan 48824.

The use of fossil fuel combustion as a means of space heating and cooling generates particulates, sulfur oxides, and carbon dioxide, with corresponding negative effects on human health and the natural environment. Various means of regulating this energy use include legal and economic tools. Economic tools may be the best long term pollution abatement strategy, since they require less information to implement and produce greater results in reducing air pollution. Estimating the costs and benefits of energy uses is an important part of using economic tools.

This research uses contingent valuation (CV) to determine how individuals perceive the value of air quality as one moves away from point sources of air pollution. Previous research has only touched on the spatial variables that influence the valuation of environmental quality. Specifically, this work uses CV to capture how people value air quality and examines the possibility of a distance decay function. Secondary socio-economic variables are included in the analysis to determine the effect they have on the above distance decay function. Last, attempts are made to derive the aggregate bid that individuals have for the value of air quality. This value has considerable utility in siting decisions for future energy conversion facilities and in the determination of the optimal use of fossil fuel combustion for space heating and cooling.

LANDSAT TM SPECTRAL RESPONSE MODEL OF SUB-ALPINE LAKE TURBIDITY USING ARCHIVED FIELD DATA by Daniel G. Brown, Department of Geography, University of North Carolina, Chapel Hill, NC 27599-3220.

Field sampling of turbidity in alpine and sub-alpine lakes, for use in geomorphic studies, is difficult to achieve. Complications involving logistical,technical, and financial considerations in sampling and instrumenting these lakes often prevent on-site satellite synchronous field sampling. Archived field data can be used in the development of an empirically-based model of lake turbidity derived from Thematic Mapper (TM) spectral responses.

The use of archived field data for model development and extension to non-sampled lakes is presented as related to: pixel window size for radiance value sampling, time lapse between field sampling and satellite over-pass, and the form of the multiple regression equation used in model building.

The nature of the physical relationships between TM multi-spectral radiance values and lake turbidity levels is presented. Precision and sensitivity of the model constructed for dynamic systems are addressed. Implications for use in geomorphic analyses that relate biophysical conditions of the basin to water quality are presented.

IMPACTS OF FLUCTUATING WATER LEVELS OF THE GREAT LAKES ON RECREATION by J. Brown, Corps of Engineers; T. Brown, Cornell University; G. Jones & A. Sudar, Environment Canada.

Recreation activity involves the greatest number of participants of all activities on the Great Lakes and is also the most diverse. An estimated 20 million people annually use the lakes and shorelines for recreation. Recreational activities can be divided into two basic groups: water-dependent (e.g., boating) and water-related (shore uses such as sunbathing). These activities may also be habitat-dependent. The effects of fluctuating water levels on these recreation interests varies greatly. The activity with the greatest sensitivity to fluctuating water levels is boating which is adversely impacted during periods of low levels when insufficient depths affect safe use. Other recreationists such as sunbathers and beachcombers enjoy the wide beaches created by lower water levels. During periods of extreme highs, the relationship reverses; beaches may be inundated, while boaters enjoy ample depths. Numerous measures, including lake level regulation, were identified to alleviate the problems associated with fluctuating levels will be investigated. Tradeoffs exist not only between activities but also from lake to lake. Techniques are available to quantify the economic impacts or mitigate the adverse effects of fluctuating water levels. However, the magnitude and complexity of the dynamic physical system make measurement of impacts extremely difficult.

MODELLING CATHOLIC PARISH CONSOLIDATION: A LOCATION-ALLOCATION SOLUTION by Kathleen Molnar Brown, GeoSpectra Corporation, Box 1387, Ann Arbor, Michigan 48106-1387.

The 1980s marked a period of difficult choices for Catholic dioceses nationwide as they faced a critical shortage of priests, empty churches in predominantly Black inner cities, and skyrocketing costs in the maintenance of existing facilities and in the construction of new ones. The model presented in this paper was developed for a midsized diocese to assist them in their parish consolidation efforts as a result of the decreasing number of priests.

Utilizing a variation of the classical Transportation Problem, existing parishes compete for the services of an increasingly scarce supply of clergy who are assigned to parishes based on minimizing their commuting distances. Clergy are assigned work capacities, travel limits, and living arrangements. Rectory capacities are also known. In turn, parishes compete with each other for clergy based on relative work indices that are a function of parish size and demand for religious functions (baptisms, marriages, funerals, etc.).

As the supply of clergy decreases through time, competition among parishes for a priest increases. The most competitive parishes are identified as home bases for itinerant clergy and for full-time resident pastors. Less competitive parishes are candidates for consolidation with other parishes and are assigned itinerant "circuit riders", while non-competative ones are identified for possible closure.

Development of the model provided a valuable planning tool in understanding the spatial organization of the diocese, its deaneries, and the local parish network.

FRONTIER SETTLEMENT IN THE ECUADOR AMAZON, by Lawrence A. Brown, Douglas Southgate, Rodrigo Sierra, and James Lewandowski, Department of Geography, Ohio State University, Columbus, Ohio 43210

This paper examines settlement in the Ecuador Amazon for the twenty year period 1962-82. Its first task is to describe the patterns of settlement. The 1982 population distribution is mapped along with in-migration waves for the four preceding five year intervals (1977-82, 1972-77, 1967-72, 1962-67) and for 20+ years. Migration flows also are mapped so as to show both origin locale and destination within the Amazon region.

The second task is to account for these flows. The role of several factors is considered: publicly and privately sponsored settlement schemes, spontaneous movement in response to economic change in the Amazon, and various government policies concerning land settlement. Attention also is given to origin locales and factors impelling individuals to migrate. Finally, the factors identified are linked to conceptualizations concerning frontier settlement.

RE-CONFIGURING CLEVELAND'S INDUSTRIAL DEVELOPMENT by Robert N. Brown, Cleveland City Planning Commission, 501 City Hall, Cleveland, OH 44114.

As part of its Civic Vision 2000 comprehensive plan, the Cleveland City Planning Commission has prepared recommendations to stabilize local manufacturing employment by shifting the pattern of development to capitalize on current market conditions.

An analysis of employment trends conducted under the Civic Vision program indicated that manufacturing employment within the City of Cleveland dropped from 220,000 in the mid-1940's to 82,000 in the mid-1980's. During this same period, manufacturing employment in surrounding suburbs experienced a period of rapid growth followed by a period of relative stability.

A subsequent analysis of industrial development trends found that 25% of the City's 110 million square feet of industrial floor area is currently unoccupied and that an additional 1400 acres of industrially-zoned land are vacant. Surveys indicate that the vacancies are concentrated along rail lines while new development is oriented to areas with freeway access.

In response, the City's land use plan recommends reduced industrial use along the rail corridors while designating sites in proximity to new freeway segments for contemporary industrial park development. In addition, the City has proposed construction of new roadways to better link existing industrial areas to the freeway system.

THE NATION OF ISLAM: A GEOGRAPHICAL ANALYSIS OF AFRICAN-AMERICAN ALIENATION by William R. Brown, Department of Geography, Prairie View A&M University, Prairie View, Texas 77446

There are approximately 36 million African-Americans residing in the continental United States. This group constitutes the largest minority population in the country. Even though there has been a significant amount of geographical studies relating to this minority group, there has not been, to my knowledge, any geographical studies of the "Black Muslims." Thus, the purpose of this paper is to present an initial geographical analysis of the Nation of Islam.

The paper is divided into five parts: (1) the early rise and growth of the Nation of Islam, (2) characteristics of black muslims, (3) modifications of the movement's philosophy after the death of Elijah Muhammad, (4) an examination of spatial diffusion: radio broadcasts and temple locations, and (5) summary and conclusions.

The results of the investigation revealed that: (1) the black muslims concentrated all of their efforts on the major cities in the U.S. with significant African-American populations, (2) the basic concept was to provide those downtrodden African-Americans, that migrated from the south to the north, with hope for a better tomorow by preaching black supremacy, pride, separatism, and hatred, and (3) all forms of racial hatred, supremacy and separatism were eliminated, after the death of Elijah Muhammad, as Imam Wallace D. Muhammad assumed the mantle of leadership.

REALISM AND URBAN RESOURCE ALLOCATION STUDIES by Jeremy D. Browning University of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

This study uses the realist approach to analyze how the San Diego Unified School District's structure is organized to enable the most efficient allocation of educational resources. Some researchers advocate using the realist approach to analyze patterns of urban resource allocation. Realism combines elements of structural Marxism and behavioralism and overcomes problems inherent in both these perspectives. The flexibility of realism enables researchers to account for varied resource allocation patterns in different settings. Despite such advantages, the realist approach is rarely applied to empirical research. Hopefully, this study will encourage greater use of realism in empirical analyses of urban resource allocation patterns.

In an analysis of educational resource allocation patterns, a realist approach focuses on the interaction between the social institution (the School District) and the agents (District managers) within it. The School District has rules regarding funding, resource allocation, and educational programs. These rules constrain agents' actions and what they are able to accomplish independently within the School District. Agents, however, do make autonomous decisions on some aspects of education. They are attempting to change teaching styles and increase parental involvement in an endeavor to raise student attainment levels. A realist analysis clearly indicates how this social institution - human agency relationship interacts to produce educational resource patterns. These patterns primarily favor white students. Unless existing power relations, benefitting whites, are re-oriented to favor ethnic groups, full racial integration of, and higher attainment levels for, students will not occur within the District.

REGIONAL AND TEMPORAL PATTERNS OF INTERNATIONAL COMMERCIAL TREATIES by S.D. Brunn, University of Kentucky, Lexington, KY 40506-0027.

The World Treaty Index (1983) is an unvaluable reference for examining bilateral and multilateral treaties. The index provides detailed information on 61,736 treaties, including partners, years, and nature of the treaties.

Four major categories are useful for geographical analysis: borders (380) frontiers (306), boundaries (209), and territories (133). The most active years for signings were 1961-70 (222), 1951-60 (195), 1971-80 (186), and 1921-30 (180).

The entries include treaties relating to delimitation and demarcation; disputes; checks and checkpoints; commerce, trade, and transportation; workers and resources; water and maritime issues. A detailed examination of 500 treaties relating to commerce and transportation reveals most are between states in West and East Europe and few between states in Latin America, Africa, and Asia, except China and her neighbors. Most treaties were signed during the 1960s and 1970s as there were efforts to promote easier commercial contacts among European states. The resolution of military conflicts and fashioning of regional economic agreements have stimulated increased international treaties.

THE HYDROLOGICAL SIGNIFICANCE OF SURFACE CRUSTING AND RILL GENERATION by Rorke B. Bryan, University of Toronto, Scarborough, Ontario M1C 1A4.

This paper reports the results of experiments carried out in the Soil Erosion Laboratory, University of Toronto. The experiments were carried out under simulated rainfall in an adjustable flume with slope lengths up to 25 m. The object was to evaluate the effect of slope length on runoff/percolation ratios. Unlike the comparatively simple increase in runoff with slope length predicted by common hydrological models, the experiments showed highly complex evolution of the ratio in time and space. The critical controls over ratios were progressive evolution of erosional and depositional surface crusts, and the incision and evolution of rill systems. Quite different patterns of evolution reflected different soil properties, surface hydraulic conditions, and rainfall characteristics.

PUBLIC PARTICIPATION IN COMMUNITY ECONOMIC DEVELOPMENT: PATHS TO SUSTAINABLE DEVELOPMENT, by C.R. Bryant, Economic Development Program, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.

Recent discussion of sustainable development frequently omits consideration of local or community involvement and yet the impacts of projects normally exhibit a strong local component. There is a danger that sustainable development will become as dominated by top-down approaches as regional economic development has been. The latter have not shown themselves sensitive to local values, goals and environments, and it is not clear that, alone, top-down approaches to sustainable development will create communities with equitable access to housing, employment opportunities, recreational opportunities and a healthy environment - the essence of sustainabl communities.

In evaluating alternative community development directions, as wide a range of perspectives on alternative scenarios is necessary. Elitist forms of community economic development planning are not likely to consider the broad range of values; one approach is to encourage the development of processes that both transfer the responsibility for determining future community directions to the community as well as incorporating a broad range of values.

A sample of community experiences from across Canada in resource-dependent communities is described in which participants from the community at large participated fully in the process of capacity-building and were encouraged to take over responsibility for planning and evaluating alternative options. Lessons are that community economic development requires a broad-based input, not just from the business community, that local citizens are indeed capable of identifying more sustainable development options, but that responsible involvement of senior levels of government in resource-dependent communities is essential.

THE UNFULFILLED PROMISE OF 'NEW LANDS': GEOGRAPHICAL MOBILITY IN A CANADIAN CONTEXT

by E. Buchanan, University of Toronto Schools, Toronto, Ontario

High rates of geographical mobility within the nineteenth century United States and Canada have been assessed as reflecting opportunities for social mobility. Reinterpretation of qualitative sources suggests that geographical mobility, paradoxically, was a strategy to ensure geographical stability and socio-economic security in future. The American 'rags to riches' myth is but one facet of a more complicated issue which parallels the Canadian experience. The Canadian myth held that agrarian frontiers offered opportunity for independence, financial security without the need to go beyond the family for major economic support. An intensive study of migration and kinship in a small study area indicates extensive mutual dependence among family members, reflected in migrant groupings and in monetary and non-monetary assistance. The family-based social welfare system countered uncertainties of survival in an era of profound transitions in the Canadian economy and society, from rural to urban, from agrarian to industrial and from independent production to wage labour. The prevalent threats of unemployment, interrupted income, accident, illness and premature death, in conjunction with the need to provide a 'start in life' for children and personal security in old age, demands consideration of the role of informal social institutions, especially kinship networks, in conjunction with the phenomenon of high rates of geographical mobility.

LAKE MICHIGAN SHOREZONE SAND DUNES: A MORPHOLOGICAL CLASSIFICATION by William R. Buckler, Youngstown State University, Youngstown Ohio 44555-3317.

Presented is a flexible sand dune classification system than can accommodate the wide range of dunal attributes found within the shorezone of Lake Michigan and along the margins of other Great Lakes. The scheme is based on dune form, relative relief, orientation, arrangement, and relationship of the dune assemblage to the underlying formation. The system is objective in that it relies on morphologic and geometric patterns which can be interpreted from stereo-paired aerial imagery at a scale of 1:24,000 and larger. In part, it is designed to give a framework for other dunal studies along the lakes. The system is not meant to express dune genesis, although in many cases it may be inferred. Eight different dune forms are recognized in this classification: linear dune ridge, sinuous dune ridge, dune terrace, dune platform, parabolic dune, complex dune field, marginal sand apron, and interdune lowland. Each form or assemblage of that form may be expressed as having low, moderate, or high relative relief. The dune form may display a trend that is parallel, arcuate, perpendicular, or oblique to the present shoreline. And within a given assemblage a single or multiple number of a specified dune form may be designated. An individual dune or dune assemblage may reside within the general beach zone or may appear climbing up, perched on top of, or falling off of, nondune formations.

RELATIONSHIPS BETWEEN PROSPERITY AND MIGRATION IN NORTH AMERICAN METROPOLITAN AREAS by Donald W. Buckwalter, Department of Geography, Indiana University of Pennsylvania, Indiana, Pennsylvania 15705

The most recent recession in the North American economy was associated with significant migration for job seeking. Places such as Florida, Texas, and California became widely known as the "Sunbelt" and received considerable attention as the locations of economic opportunities while older industrial areas were deemed undesirable.

This research focuses on the hypothesis that migration from the older industrial areas was greater than warranted by their degree of economic distress. Census of Population and Census of Business statistics are used to examine the relationship between economic prosperity and population migration. Economic prosperity is examined in three aspects: income, consumption, and employment. Correlation and regression techniques are used to analyze the relative importance of the three aspects as influences on migration. Migration corresponds most closely with consumption even though employment and income seem to be better indices of short and long-term prospects for the migrants. Migration from high wage areas to low wage areas indicates that forces other than the circular and cumulative causation process were at work. Evidence suggests that the social composition of migrants is different during a recession than when the economy is growing.

SMALL TOWN PLANNING PRACTICE IN THE UNITED STATES AND CANADA by Henry W. Bullamore, Frostburg State University, Frostburg, Maryland 21532.

Small towns in the United States and Canada differ greatly in the organization and staffing of planning offices. Comparison of planning approaches involves examining the planning context, planning structures, and plan implementation. Review of secondary materials suggests the planning context in most North American small towns involves: infrastructure/capital improvement programs, commercial district revitalization, and effectively using land use controls to manage change. In terms of planning structures, Canadian small towns typically use more trained planning professionals, either locally based or as consultants, to address problems. Citizen control of planning in US small towns frequently means untrained volunteers are working with political controversy. As a result, plan implementation in Canada usually involves faster enactment of more comprehensive and technically detailed plans.

Examples of small town planning in both countries are presented for illustration. Efforts to improve small town planning in both countries are discussed with recent efforts to enlarge some provincial planning staffs and to establish training programs for "citizen planners" in some US states noted.

LAW AND THE LANDSCAPE: PRIVATE RESERVOIRS IN NAPA COUNTY, CALIFORNIA by Teresa L. Bulman, University of California, Davis, Dept. of Geography, Davis, CA 95616

Nearly one thousand private reservoirs litter the floors and hillslopes of the valleys of Napa County. Their presence on the landscape is ubiquitous and their role in water supply to the vineyards, which are the economic backbone of the county, is critical. The number and areal extent of privately-owned reservoirs in Napa County has increased significantly in recent years due to increased water demand for agricultural enterprises and due to court-imposed restrictions on water diversions by riparian owners.

This paper provides a spatial analysis of privately-owned reservoirs in Napa County, California, placing such reservoirs in the context of Napa County's regional geography, including topography, climate, hydrology and water resources, water projects, historical and present land use, and institutional arrangements. An evaluation of the quantitative contribution of private reservoirs to the overall water supply of Napa County is given and the impact on reservoir construction of the California decision in the case of State v. Forni is examined.

The location of private reservoirs in Napa County is found to be a function of water demand for farming purposes, mesoclimate variability, legal and institutional constraints, and land use changes.

PARADIGM CLASH AND POLITICAL STRUGGLE OVER THE ECOLOGICAL AND SOCIAL CONSEQUENCES OF EXTRACTIVE EXPORT ECONOMIES by Stephen G. Bunker, Sociology, University of Wisconsin, Madison WI 53706

Geographers' headlong flight from environmental determinism and regional economists' drive toward nomothetic abstraction severely restricts their ability to deal with either the environmental or economic constraints on and consequences of natural resource extraction or with the potential resistance of populations in the affected regions. This paper proposes an approach to the intersection of natural and social production systems to allow analysis of their reciprocal and interactive determinancies. It then traces the ways that different authors, including Harold Innis, Karl Wittfogel, and Alfred Crosby have attempted to deal with natural determancies, and how the voices of intellectuals on extractive peripheries are silenced by mainstream theories grounded in an exclusive social determinism and by the uses to which agents of export-promoting states can use these theories to silence ecological and social criticism

CELESTIAL ARCHETYPES OF THE TERRITORY OF CANADA by Luc Bureau, Département de géographie, Université Laval, Québec G1K 7P4.

There is nothing outrageous in saying that Canada is a myth. As much could be said of any other country. The canadian myth has something special: it is terribly messy and polymorphic. You could call it a real chameleon, which is moreover, the product of hybridization. The moment you think you have a good mental hold on it - bang! it metamorphoses into something else. The only way to account for it is to follow its tracks. To illustrate my subject, I will draw from various texts allusions I have come across several which confirm the obsessional presence of a primordial "double" ("the celestial archetypes") of the canadian reality. The analyses undertaken converge on three anchoring points: "impossibilism", euphemization", and heroicity".

THIRD WORLD HOUSING POLICIES AND DEVELOPMENT STRATEGIES IN THE POSTWAR PERIOD by Rod Burgess, Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, MD 21210

This paper locates the shift in emphasis in Third World housing policies from 'conventional' towards 'self help' housing in the context of shifting general development strategies: from modernizing strategy through redistribution with growth to the current structural adjustment strategy. An explanation of the relationship between Third World housing policies and development strategies is then pursued using concepts from articulation theory.

BED LOAD MEASUREMENTS OF THE NOTTAWASAGA RIVER, ONTARIO AND SELECTED TRIBUTARIES by Marylou Burkard, Department of Geography, Wilfrid Laurier University, Waterloo, Ontario, N2L 3C5.

Sediment yield estimates of rivers in Ontario have been based almost solely on the measurement of sediment in suspension without any bed load monitoring. In research done in other parts of North America, shallow sand bed rivers similar to the Nottawasaga River in southern Ontario have been found to be carrying as much as 50% of their sediment as bed load. This study was initiated to determine if the Nottawasaga River does indeed fit this regime. It is also important to measure bed load since it plays an important role in shaping the bed of the river and controlling the stability of the banks of the river channel. Between July and October of 1989 bed load measurements were taken from ten bridge sites on the Nottawasaga River and three of its tributaries using a Helley-Smith bed load sampler. The objective was to compare the transport rates of the tributaries and the main channel, to compare the suspended sediment load with the bed load and to investigate probable causes for differences in bed load transport along the river. Velocity measurements were taken with an electromagnetic current meter. Results are being analyzed to determine if high transport rates are a result of discharge, velocity profile, depth or the availability of sediment supply.

TELECONNECTIVE ASSOCIATIONS WITH REGIONAL SCALE TROUGHING EVENTS IN THE SOUTHWESTERN UNITED STATES by Adam W. Burnett, Michigan State University, East Lansing, Michigan, 48824.

The spring and fall climatology of North America is often characterized by the occurrence of strong migratory wave disturbances, many of which exhibit longer wavelengths than the typical short wave. Longer wave disturbances are particularly noteworthy during the spring when they originate in the southwestern United States and move slowly northeast into the central states. Given the strongly baroclinic environment that typically accompanies these spring events, such storms are capable of producing severe convective activity and regionally heavy precipitation. Because southwestern storms represent regional scale troughing events, their occurrence suggests teleconnective changes throughout the entire hemispheric wave train.

Using composite 500 mb height difference charts constructed from daily gridded data spanning the years 1946-1987, this analysis focuses on the teleconnective features associated with the onset of southwestern troughing. These features include: (1) changes in wave position and wave number; (2) 500 mb trajectory variations over the Asian coast; and (3) 500 mb split flow over the eastern Pacific Ocean and western North America.

THE PSYCHOLOGICAL DIMENSIONS OF WILDERNESS: A COMPARATIVE ANALYSIS by Kevin F. Burr and Philip Dearden, Department of Geography, University of Victoria, Victoria, British Columbia V8W 2Y2.

Wilderness is an important issue in British Columbia. The government of British Columbia deemed it necessary to establish a Wilderness Advisory Committee in 1985 to review and report on the place of wilderness in society in the province. Recently, the media has highlighted the controversy and confrontation over several areas in British Columbia on the issue of preservation versus development. This issue continues to stimulate public debate.

This study surveyed four groups of subjects, members of the general public, members of the Canadian Parks and Wilderness Society wilderness users, and wilderness managers, on their psychological dimensions with respect to wilderness. The internal and external psychological dimension is the locus of control which was assessed by an Internal-External Wilderness Scale developed for the research. A more societal, external psychological dimension is the perceptions attitudes, values, and beliefs of individuals with respect to wilderness on a broader scope. This dimension was assessed by a Wilderness Environmental Protection Scale developed for the research A third scale which contained statements on pollution and natural resources was also used in the research to determine the overall environmental concern of the subjects.

The results of this study indicate statistically significant differences between the four study groups and their orientation toward wilderness and environment as measured on the psychological scales. These differences may help explain the ongoing conflicts over wilderness designation and management in British Columbia.

THE U. S. PRESENCE IN CANADIAN ACADEMIC GEOGRAPHY by Allen D. Bushong, University of South Carolina, Columbia, South Carolina 29208.

This presentation seeks to document the extent to which U. S.-trained geographers are a part of the structure of Canadian academic geography. It does so by showing graphically the distribution of those recipients of an earned Ph.D. degree in geography awarded by a U. S. university who are faculty members in graduate geography programs in Canadian universities. The presence of these recipients within the structure of Canadian academic geography is further compared with the presence of recipients who were awarded their earned doctorates from Canadian universities and from universities overseas. For the U. S. recipients, the patterns of the schools awarding their degree and of their mentors are also analyzed. The analysis also seeks to determine which U. S. Ph.D. recipients were born in Canada and who are therefore returning home for academic employment following graduate study.

The number of U. S. Ph.D. recipients in individual Canadian geography departments varies widely, from none to a near majority. The data suggest that the U. S. presence in Canadian academic geography is not as pervasive as many perceive.

TEXTURAL ALGORITHMS FOR RURAL LAND USE ANALYSIS IN BOTSWANA by Charles E. Bussing and M. Duane Nellis, Kansas State University, Manhattan, Kansas 66506.

The government of Botswana recognizes that sustained economic development requires an effective natural resource policy and an environmental monitoring program. Many of Botswana's resource problems are interrelated. For example, rangeland degradation, results both from natural phenomena such as drought and from human activities such as overstocking, clearing for cultivation, burning, and removal of trees for firewood.

Textural algorithms applied to the Landsat thematic mapper, multispectral, and SPOT multispectral digital data sets, offer an approach for understanding the impact of environmental and human factors on rangeland conditions. Texture can be described as fine or coarse. When there is no spatial pattern in the rangeland unit and the gray tone variation between features is wide, a fine texture results. As the spatial pattern in the rangeland unit becomes more definitive and extends over many pixels, a coarser texture results. The degree of homogeneity (fine texture) or heterogeneity (coarse texture) as measured by textural analysis was correlated, with vegetation impact resulting from human and environmental factors. Overgrazing, for example, created a higher degree of heterogeneity in the landscape unit.

This research demonstrates the feasability of utilizing remote sensing algorithms for measuring type and degree of impact on Botswana's rangeland resources. Such information will be of critical value when the government of Botswana implements its National Conservation Strategy.

ASPECT-RELATED MORPHOMETRIC DIFFERENCES ON SNOW-AVALANCHE PATHS IN SOUTHERN GLACIER NATIONAL PARK, MONTANA BY David R. Butler, Department of Geography, University of Georgia, Athens, Georgia 30602, and Stephen J. Walsh, Department of Geography, University of North Carolina, Chapel Hill, NC 27599-3220

All snow-avalanche paths in the southern portion of Glacier National Park, Montana, were examined on aerial photographs and delineated on U.S. Geological Survey 1:24,000 topographic maps. Morphometric variables were collected from the starting zone, track, and runout zone of each avalanche path. Overall path slope angle and aspect were also recorded. Ground truth data revealed the overall accuracy of data collected from the maps.

Most of the avalanche paths in the study area face generally northwest or southeast, a result of the orientation of the glaciated valleys on which the avalanche paths are superimposed. When the avalanche paths were categorized into generally northwest-facing versus southeast-facing aspects, distinct morphometric differences emerged. Northwest-facing paths begin at higher elevations than their southeast-facing counterparts, are steeper, and have smaller runout zone areas. Southeast-facing paths also extend to lower elevations. Differences in slope steepness and runout zone area between the two aspect categories are attributed to differences in the efficacy of freeze-thaw and debris flow processes on the avalanche paths.

THE RESORT CYCLE REVISITED - A DECADE OF DISCUSSION by R.W. Butler, Department of Geography, University of Western Ontario, London, Ontario N6A 5C2.

In 1980 the author published an article entitled The Concept of a Tourism Area Cycle of Evolution: Implications for Management of Resources in The Canadian Geographer. The model outlined then suggested that destination areas at a variety of scales evolved in a common manner through identifiable stages of development from exploration to decline or rejuvenation. In the intervening decade the model has become one of the most quoted concepts in the English language tourism literature, and has been applied in a variety of settings. In general there has been support for the concept, although inevitably suggestions for improvement and change have been made, and justifiable concern expressed over the difficulties of operationalizing the model. This paper reviews the applications of the model and the conclusions drawn and explores the wider ramifications of the concept of evolutionary growth of tourist destinations. As the tourism industry has diversified, both in market and supply, so the forms of tourism have increased in number. In the context of concerns over sustainable development and environmental impacts (human and physical) it is argued that the model has a far wider applicability than previously suggested. The concepts of inevitability of change and deterioration of quality in the context of tourism detinations implicit in the model suggest a strong analogy to Hardin's Tragedy of the Commons. The paper elaborates on this analogy and concludes with a discussion of further application and testing of the model.

RULES FOR AUTOMATING FEATURE DISTINCTIONS by Barbara P. Buttenfield, NCGIA, Department of Geography, SUNY-Buffalo, Buffalo, New York 14260.

The purpose of this research is to evaluate automatic methods to improve cartographic line simplification, and specifically to determine locations in a coordinate file where the geometry of a line feature changes, to enable automatic tolerance value modification. Tolerance values must be modified periodically to insure both accuracy and recognizability of graphic details on a generalized map. At present, decisions about where to adjust tolerance values are made manually, and form an expensive bottleneck to map production for government and commercial organizations.

Any automatic solution requires formalized description of the amount and type of details that occur along the extent of the digital file. This is complicated by the need to accommodate scale-dependence in the formal descriptions. Previously developed methods for digital description of line characteristics that are scale-dependent will be discussed in the context of formalizing rules for generalization. Determination of changes in geometry may be inferred statistically, although the shape of the probability density function on which such inferences are based presents a challenge. Bootstrap methods will be proposed by which such inference may proceed, and tests run for sample data sets from several sources to test the validity of the proposal.

CIVIC ACTION PROGRAMS AS INSTRUMENTS OF DEVELOPMENT: THE CASE OF AFRICA by Kent Hughes Butts, Strategic Studies Institute, U.S. Army War College, Carlisle Barracks, PA 17013-5050

A state's government may be viewed as a political system that depends for its legitimacy upon its ability to meet the demands of its populace. In developing countries, limited physical infrastructure and economic resources may constitute sizeable barriers to development that impede governmental efforts to establish or maintain legitimacy. A fact of life in the developing world is that the armed forces, because of their relative advantage in training and organization, are often more efficient than comparable civil agencies and better suited to accomplish certain developmental tasks.

Recognizing this fact, the United States Department of State established an African civic action program designed to encourage African military organizations to undertake projects of direct benefit to the civilian populations of their countries. This effort to encourage the military's participation in the nation-building process, takes advantage of existing infrastructure and the synergies of association with ongoing military and civilian aid programs.

This paper details the implementation of the African civic action program, examines the criteria upon which it was designed and determines the appropriateness and value of such programs to the process of nation-building and state development.

EVALUATING THE IMPACT OF DEVELOPMENT UPON TRADITIONAL RURAL COMMUNITY SUSTAINABILITY

-David Butz, Department of Geography, McMaster University, Hamilton, Ontario L8S 4K1, Canada.
-S.C. Lonergan, Department of Geography, University of Victoria, Victoria, B.C. V8W 2Y2, Canada.
-B. Smit, Department of Geography, University of Guelph, Guelph, Ontario N1G 2W1, Canada.

Development initiatives often result in degradation, rather than improvement, in the well being of recipient communities. This may be because development agents lack adequate perceptions of indigenous priorities, and fail to appreciate the holisitic nature of traditional rural communities. This paper offers a framework, and the beginnings of a methodology, for evaluating past and potential community development, which considers initiatives' costs or benefits to a community in indigenously valid terms, and which also considers the relationships and integration among community components. The framework is based on the notion of community sustainability, and its description and assessment in terms of economic viability, social vitality, political validity and ecological maintenance. The concept of community sustainability draws from several sub-disciplines, including dependency theory, sustainable development, social impact assessment, community studies, and symbolic interactionism. Relevant aspects of these approaches are discussed in the attempt to formulate a framework for evaluating rural community development.

CHANGE AND CONTINUITY IN NEW SPAIN by Karl W. Butzer, University of Texas, Austin, TX 78712-1098.

Spanish conquest and colonization of the New World involved political and economic, but not demographic dominance. Castilian settlers, except for the Basques, represented a relatively homogeneous sociocultural group, dispersed over a vast, heterogeneous area by nodal/cellular migration. Primary migration established the broad patterns of settlement within 75 years, by 1570, involving about 20% of close to half million migrants before 1810. Confronting densely settled and advanced indigenous peoples in many areas, state and church followed a policy of "inclusion," with acculturation, socioeconomic domination, and assimilation, rather than "exclusion" by displacement and cultural substitution. In lowland and montane tropical environments, the Spaniards modified or abandoned their traditional ecology, switching to commercial plantations (sugar, cotton, cacao), indigenous cultigens, or cattle raising. In arid or summer-wet highland environments, wheat farming had to be adapted to irrigation and "soft" wheats, while stock raising or mining characterized frontier regions. Olive oil and wine were deleted from common diets. The land grant policy created large estates with absentee landlords and indigenous laborers, excluding small freeholders. Corporate institutions remained weak, controlled by the oligarchy and administration. Spanish estates and towns were embedded with an older, indigenous landscape or dependent on non-Spanish labor. Given the fundamental ecological and socioeconomic readaptation and sociodemographic dilution of the immigrant society, there was considerable loss and simplification of Old World traits. Social stratification was accentuated, and instead of an egalitarian pioneer society, a dual (European and Indian) society emerged. As indigenous socioeconomic configurations were marginalized, two-way assimilation favored new sociocultural identities in the several, regional settlement nodes. Widely separated, and marked by diverging socioeconomic trajectories in response to different environments and indigenous contexts, a suite of different Creole societies emerged as nuclei for the post-Independence nations of Spanish America.

TOP-DOWN OR BOTTOM-UP PLANNING IN SWEDISH PLANNING LEGISLATION AND PRACTICE by Erik Bylund, Department of Geography, Umea University, 901 87 Umea, Sweden.

An investigation has been made in 8 swedish municipalities in order to look after a possible new bottom-up planning procedure as a consequence of a new Planning and Building Law (PBL) of July 1987, that may have stimulated or given better opportunities to local initiatives and planning decisions even with regional impact. Before PBL the planning process has been characterized by a top-down planning, specially concerning regional planning, infrastructural investments etc, even though a municipality had and still has nearly a monopoly of planning for built-up areas. The State and its regional administration have been the managers of the planning process from above and in many cases reserved the last decision in matters, originating from the municipalities, for itself. A good example is the model for planning of the agricultural sector in Sweden.

Some preliminary results of the study indicate that you can't talk of a general new bottom-up planning paradigm or of a maintained dominating top-down planning paradigm. The way of planning is very much directed by the nature of the municipality, i.e. the size, the number and density of population, its regional and hierarchical position in the communication network etc. Special attention is paid to the role of the 24 provincial governments in Sweden; they are serving as a kind of catalysators for planning matters coming down from the central government and state boards and matters coming up from the municipalities. Their role of both the "elongated arm of the government" and the precedessor of the municipalities within the provinces has been a little bit changed after the introduction of the new PBL. This role will also been examined.

REFORMING THE CONTINENT: THE METHODIST ORGANIZATION OF AMERICA, 1784-1844 by John M. Caldwell, University of Oklahoma, Norman, Oklahoma, 73019-0375.

Adherents of John Wesley's religious revival emigrated to the American colonies during the mid-eighteenth century and thereafter. To these members of "The People Called Methodists" Wesley sent missionaries beginning in 1769. Before and after the American Revolution these workers began organizing the American continent into the particular Methodist ecclesiastical structure, creating a Methodist geography not always conforming to the existing political geography. An analysis of the evolving boundaries of the denomination indicates two periods: (1) areal expansion, 1784-1820 and (2) areal concentration, 1820-1844. The use of the itinerant ministry was particularly responsible for the phenomenal growth of Methodism, both areally and numerically. By 1844, when the main Methodist body split over the question of abolitionism, Methodism had been transformed from a minor group within the Anglican community into the most important denomination within the United States.

CANADIAN-U.S. ELECTRICITY TRADE AND THE FREE TRADE AGREEMENT by F.J. Calzonetti. Department of Geology and Geography, West Virginia University, Morgantown, WV 26506

Canadian power imports into the United States have increased substantially over the past decade. Canadians have been very successful in marketing power to electricity-short regions near the border, but other areas farther south in the United States are also seriously considering Canadian electricity as a partial solution to their supply requirements. This has alarmed some areas in the United States which now have excess generating capacity and view interregional electricity trade as an economic development option. This paper discusses the implications of the Free Trade Agreement on electricity trade in the Midwestern and the Northeastern United States, in relation to Ontario Hydro and Hydro Quebec. In particular, will the Free Trade agreement effect the ability of Midwestern states to market economy and capacity power to the Northeastern states? Will United States utilities likely engage in certain practices to control power flows that will likely restrict Canadian power from penetrating deep within the United States? How can the United States and Canada work together on electricity trade to ensure the best use of resources and to maintain environmental quality? Finally, how can the Free Trade Agreement sooth the concern by United States utilities that Canadian power is not a reliable alternative source.

STREAM GENERIC TERMS AS INDICATORS OF HISTORICAL SETTLEMENT PATTERNS

by Jon C. Campbell, U.S. Geological Survey, 523 National Center, Reston, Virginia 22092, U.S.A.

Geographic names of the United States may be analyzed with relative ease using the Geographic Names Information System, data-sorting techniques, and computer-driven plotters. The national series of topographic maps published by the U.S. Geological Survey serves as the primary source of the stream names that are the focus of this study. The word "stream," for the purpose of this paper, refers broadly to any body of flowing water. A computer search of the stream names in each State reveals and locates unusual stream generic terms, such as kill (Dutch, Hudson Valley), coulee (French, Louisiana and North Dakota), and cañada (Spanish, New Mexico). More common stream terms, for instance, creek and river, are also plotted and ranked on charts to illustrate regional differences in the use of these terms in stream names. This paper examines the relative frequency and the distribution of toponymic terms found in the names of streams in the United States and demonstrates the correlation and disparity of selected terms with historical patterns of settlement. The study of generic terms in place-names is shown to be an instructive, but not always reliable, aid to historical research.

DISPLACEMENT ERROR IN VECTOR-RASTER-VECTOR CONVERSION.

by Changyong Cao, Department of Geography, Louisiana State University, Baton Rouge, LA 70803

This paper examines the magnitude and factors of the displacement error in vector-raster-vector conversions, a process often used in GIS applications. The displacement error is measured by the sum of the small areas enclosed by the original polygon and the revectorized polygon. An algorithm for calculating the displacement error has been developed, and a PASCAL program has been written. Samples from the Louisiana county boundary file and the China county boundary file are used in applying and testing the algorithm.

The results of the experiment show that the displacement error can be very high. The displacement ratio depends largely on the size of the grid used in the vector-raster conversion, the shape of the polygon, and the complexity of the line segments. Three types of displacement error can be identified: total displacement, individual polygon displacement and individual line segment displacement. In order to further examine the relationship between line complexity and displacement error, the fractal dimensions of selected line segments from the county boundary files are measured. The results are compared with other previous studies.

SPATIAL IMPACTS OF U. S.-CANADIAN TRANSBORDER TRUCKING

by Russell B. Capelle, Jr., Regular Common Carrier Conference, 2200 Mill Road, Suite 350, Alexandria, Virginia 22314.

Borders of economic-political togetherness rather than borders of separation have appeared globally in the late 1980s and are on the horizon in the 1990s -- the Austro-Hungarian border in 1989, "The United States of Europe" in 1992, and U. S.-Canadian opportunities provided by the January 1989 Free Trade Agreement and earlier transportation "decontrol" legislation. This investigation focuses on spatial impacts of changed surface transportation commodity movements between the U. S. and Canada, with particular attention to the trucking industry.

Geographers and others have analyzed the impacts of the U. S.' 1980 Motor Carrier Act deregulation and have highlighted economic, operating environment, and safety changes. Researchers are just now analysing effects of Canadian decontrol and comparing them to effects found in the U. S. This paper offers a synthesis of conclusions from Canadian and American authors, covering publications of this author, R. Beilock, Y. Bigras and J. Roy, G. Chow, F. Collins and J. Bowland, T. Corsi et. al., J. Farrow et. al., J. Heads, and B. Raney. Recent federal studies in both countries, trade association research, and the syntheses of results from focused conferences such as the Canadian Transportation Research Forum annual meeting in Halifax in May 1989, provide enlightening analyses.

The author offers detailed statistical conclusions on: (a) expansion of territorial extent of operations and increasing average lengths of haul; (b) size of carriers and merger tendencies; (c) segmentation of the industry and changes in the mix of private, truckload, and less-than-truckload carriers; and (d) safety performance and safety impacts of deregulation-induced changes in the trucking industry.

THE REGIONAL RESPONSE OF MODELLED SOYBEAN YIELD TO CLIMATE VARIABILITY

by Gregory J. Carbone, University of South Carolina, Columbia, SC 29208.

Many climate impact studies assess the degree to which climatic change may influence agriculture. Often, these studies use the results of general circulation models which predict changes in important climatic variables due to some external forcing (e.g. CO_2 doubling). These perturbations are frequently added to climatic normals to determine resulting changes in some aspect of the agricultural system, such as crop yield. While such methodology helps to estimate the impact of average climatic changes, it may obscure important features of climatic variability.

This presentation illustrates the effect of prescribed meteorological changes on modelled soybean yield at 500 locations in the central United States. Adjustments were made to meteorological data sets from 1953-1975 to represent the impact of climatic change on soybean yield for a number of different years. Since each year contains an internally consistent set of meteorological variables, the results of precribed changes over many individual years may more accurately show the effects of climatic change on crop yield.

DECLINING SUBURBS: DISINVESTMENT IN THE INNER SUBURBS OF CAMDEN COUNTY, NEW JERSEY

by Paul David Caris, Rutgers University, New Brunswick, NJ 08903

It is now apparent that many aging inner-ring suburbs in the United States have experienced economic decline and distress which has been associated with American inner-city areas for several decades. In addition to typically urban problems such as increasing traffic congestion, rising crime rates, and the physical aging of buildings, it is likely that certain suburbs are characterized by declining housing markets, and financial disinvestment similar to that seen in central city neighborhoods. The inner-city disinvestment process has been the focus of much urban research, but little work has been undertaken to identify and explain the occurrence of suburban disinvestment.

This study examines the availability of home mortgage credit, and selected housing market indicators, in order to uncover the geography and timing of the suburban disinvestment process in Camden County.

* * *

ANTARCTIC MESO-CYCLONE REGIMES FROM SATELLITE AND CONVENTIONAL DATA

by Andrew M. Carleton and Mark J. Fitch, Department of Geography, Indiana University, Bloomington, IN 47405.

Synoptic climatological aspects of non-frontal meso-scale cyclones over higher southern latitudes ("polar lows") are investigated using combinations of high resolution polar-orbiter satellite (DMSP, NOAA AVHRR) and conventional meteorological data. The latter includes Antarctic automatic weather station data. The analysis is part of a larger project that seeks to determine the dynamical character of meso-cyclones in the Ross Sea sector, and their possible forcing by the katabatic winds.

We find maximum frequencies of meso-cyclones in the transition months, at least for 1988. Cyclogenesis shifts eastward from the Ross to the Amundsen sectors between April and October, and suggests changes in the longitudes of peak cold air occurrence. Meso-cyclone tracks, while oriented generally west to east, exhibit an equatorward component. For these systems, we have determined also the typical life spans and translation velocities by latitude zone. We undertake composite analysis of SLP, 500mb and 1000-500mb thickness anomalies for times of polar low outbreaks and contrasting inactive periods. The outbreak regimes are characterized by enhanced meridional flow in longitudes of the Ross Sea with the development of a marked trough and associated cold advection. In the inactive periods the flow is typically more zonal. The characteristic cloud structure of meso-cyclones is determined from density slicing of thermal infrared satellite data in digital form.

RESTRUCTURING NATURE: ENVIRONMENTAL POLITICS IN BOSTON by Scott Carlin and Jody Emel. Dept of Geography, Clark University, 950 Main St., Worcester, MA 01610.

In the United States, the current environmental reform movement has alternatively been presented as serving the needs of the elite and working for democratic social improvement. Urban environmental reform movements, like many others, date back at least to the mid-1800's when urban industrial expansion got underway. An historical analysis of these urban movements provides important insights into their current role in restructuring the urban landscape. Environmental reforms have been made in the name of improving conditions necessary for capital accumulation and protecting public health. While both of these ideological claims have broad public support, the benefits of reforms are generally not evenly shared. The bitterness that environmental reforms often generate is a reflection of this unevenness. Through an examination of the politics of water supply and sewage in Boston over the last 125 years, we will show why the benefits of environmental reforms have not been uniformly distributed within metropolitan areas. We will also discuss the extent to which environmentalism (in its many guises) contributes to the process of uneven development under capitalism.

GEOGRAPHERS AND CROP DEVELOPMENT IN THE INTERNATIONAL AGRICULTURAL RESEARCH CENTERS: TRITICALE AND THE INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER (CIMMYT), by Judith Carney, Geography Department, UCLA, Los Angeles, CA 90024

This paper addresses the type of contribution geographers with an agroecological framework can bring to crop development research at the international agricultural research centers. The research examined triticale, a cross between wheat and rye, developed by CIMMY as a food crop for resource-poor farmers in tropical highland areas. Since its diffusion over twenty years ago in the central Mexican highlands, CIMMYT's biological scientists have focused research on the improvement of triticale's milling qualities as a bread wheat substitute. Field research, however, showed that triticale is cultivated only as a feed crop for specific farm animals whose meat and byproducts are marketed. Besides drawing attention to the disparity between breeding research and smallholders' use of triticale, the study illuminated the significance of indigenous environmental knowledge for decisions on land use and crop adoption. The study also addressed the more theoretical issue of how smallholders' knowledge systems can facilitate crop experimentation and the adjustment of cultivars to farmers' needs during periods of social and economic change. While the study's results led CIMMYT to expand triticale research towards feed and forage types, it also provided many of the center's biological scientists with their first exposure to an interdisciplinary, agroecological framework. This framework is indispensable for developing appropriate and sustainable agricultural transfers for the rural poor, and it requires a conjuction of indigenous and Western scientific methods. By identifying the importance of soil microenvironments in farmers' utilization of triticale, this study provided an example of one way in which the two types of science can be reconciled.

GEOGRAPHY OF CASSAVA: A PERSPECTIVE ON POVERTY AND ENVIRONMENTAL DEGRADATION by S.E. Carter, Agroecological Studies Unit, Centro Internacional de Agricultura Tropical (CIAT), Apartado Aéreo 6713, Cali, Colombia, S. America.

This paper examines the geography of an important tropical staple, the root crop cassava (Manihot esculenta), to illustrate the interaction between processes which generate poverty and cause environmental degradation in rural Latin America.

Census reports of cassava hectareages show that at a general level environmental and particularly edaphic conditions in three quarters of the area occupied are marginal for the crop. Cassava is concentrated in economically peripheral areas, and grown by poor people. Particular qualities of the crop allow it to meet needs dictated by this combination of circumstances, and to avert hunger.

A comparison of important cassava growing areas shows similarities in social structures, patterns of resource control, and processes of rural change. Environmental degradation results from interaction amongst these factors.

Areas of high cassava production in Latin America are peripheral to regional and world systems. They provide cheap foodstuffs and labour for urban and agroindustrial cores, and through uneven terms of trade receive little in return. Development orientated research must begin by acknowledging the dynamic nature of social and environmental processes in such areas. Interventions which encourage social change will have a more significant and lasting impact on hunger, poverty and environmental quality than short term remedial or adaptive innovations.

PORT CITIES OF SOUTHEASTERN CHINA: HISTORICAL URBAN DEVELOPMENT IN XIAMEN, FUZHOU, AND NINGBO by C.L. Cartier, Department of Geography, University of California at Berkeley, Berkeley, CA 94720.

Intermediate-sized seaport cities in China share common developmental histories and fulfill comparable regional roles. In this study, I employ an inductive approach to examine how historical human processes have influenced changes in urban form and the course of social and commercial institutions in the cities of Xiamen, Fuzhou, Ningbo. Long-distance trade is a primary current of investigation that reveals the significance of these cities as local and regional mercantile centers. China's semi-colonial experience of the later nineteenth and early twentieth centuries instigated profound changes in several—but not all—aspects of urban form and life.

INCREASED WINTER STORMS IN CHILE AND SOUTH AFRICA DURING ENSO EVENTS by Cesar. N. Caviedes University of Florida Gainesville, FL 32611.

Relatively little is known about the impact of ENSO in the South Pacific on temperate latitudes of southern continents. A 1849-1987 series of annual rainfall from Capetown (R.S.A.) and Valparaiso (Chile) is analyzed and fitted to a mixed probability model. Years with strong ENSO events show abnormally high winter rains and storms in Chile and South Africa due to enhanced frontogenesis and cyclogenesis under warm tropical ocean conditions. Dry winters in South Africa occur only rarely during ENSO episodes and they correspond to years with extended droughts in the southern half of Africa.

The search for rainy-stormy years beyond the span of instrumentally recorded series was continued with surrogate sources: historical records of shipwrecks during winter months. Recognized major ENSO events of the 16, 17 and 18th centuries stand out also as years with the highest number of shipwrecks.

Satellite imagery during ENSO events reveals the eastward progression of huge fronts in the temperate South Pacific that strike the coast of Chile, lose strength temporarily over the Andes and regenerate when crossing the South Atlantic. Upon reaching South Africa these systems cause stormy weather and intensified rain. The historical series of shipwrecks suggest their occurrence also in pre-observation times.

SCIENTIFIC BENEFITS FROM A COLLECTION OF EARLY MAPS OF KOSOVA PROVINCE, by Muharem Cërabregu, University of Prishtina, NSF, Section of Geography, Yugoslavia

To understand the connection between space and time, one must first know something about the local collestion of early maps, which in general mirror topological relationships. Despite it's relatively small size, geographical data concerning the Province of Kosova has been continously present during all mapping periods, even on schematic medieval representations. This comes as a consequence of it's important geographical postion in the central part of the Balkan Peninsula. This collection, due to it's rich inventory of geographical data, can be considered as a source of lacus classicus importance. Amongst the available data can be found information related to the evolution of the two largest urban centers:

1) ULPIANA
   res publica ULPIANA
   (rebuilt and renamed by
    Justinian the Great)
   IUSTINIANA SECUND
   IUSTINIANA
   ISTRIANA
   ISTRINA o'PRISTRINA
   PRISTINA (pri +- Istrina)
   PRISHTINA

2) THERANDA
   ZERANDA
   PRIZERANDA (-pri +- Zeranda)
   PRIZERENDI
   PRIZERENI
   PRIZRENI

The geographical term -pri (-per, -pre) the meaning of which is castle, city, big city, was elucidated by American academic Eric Hamp in the year 1982.

TRENDS IN UPPER AIR CIRCULATION: IMPLICATIONS TO THE GREENHOUSE EFFECT by Randall S. Cerveny, Arizona State University, Tempe Arizona 85287.

Numerical climate model simulations of greenhouse warming caused by increases in atmospheric carbon dioxide indicate that the polar regions of the earth should experience greater warming in the lower troposphere and at the surface than will the region of the tropics. Thermodynamic relationships show that such a reduction in the pole-to-equator temperature gradient should result in changes in the speed and direction of the upper air circulation. Since the atmospheric concentration of carbon dioxide has dramatically increased over the last forty years of available upper air data, identification of corresponding changes in the upper air circulation therefore may provide valuable information on the possible existence and extent of greenhouse warming. This study examines the existing upper air wind velocities at the 850 mb and 500 mb levels for various locations in the United States from the 1950s to the present for evidence of such trends. Preliminary results show a marked reduction in July wind speeds at 500 mb in the eastern United States along 40° N from the 1950s to the present. Such a reduction may indicate an extension of the Bermuda high into this region.

AIR POLLUTION IN THE SOVIET UNION by F.Chalidze Pearl Street #2 Burlington, Vermont, 05401.

The official total figure of harmful emissions into the air in the USSR is 105 million tons. This figure does not take into account small sources of air pollution as well as dust pollution.

In spite of "glasnost'", data concerning pollution is published only in part, and complete figures are not available. Because air quality monitoring takes place only in a few big cities, official data about air quality is far from complete.

In 1987 more than 100 cities in the Soviet Union had air pollution 10 times over the allowable level. Large areas of coniferous forests in Central Russia, Lithuania, the Baikal region etc. are dying because of acid rain. Air pollution destroyes vegetation cover in Siberian tundra,that cause thermocarst processes that are impossible to stop.

Though statistics on environmentally induced diseases are not available in the USSR, numerous cases of mass poisoning by polluted air became known in the last two years. Many cities in the Soviet Union have high rates of respiratory diseases, hypertension, allergy etc., caused by air pollution.

Trends of air pollution are not promising. Many cities have reported an increase of emissions. Apparently, the goal to decrease sulphur dioxide emissions by 30% by 1993 , according to International obligation, will not be reached.

COLD AIR PONDING AND CIRQUE GLACIATION: CONNESS GLACIER, CALIFORNIA by Fred B. Chambers, Arizona State University, Tempe, Arizona 85287.

An analysis of the temperature and slope profiles for Conness Glacier, Sierra Nevada, California, indicates that a significant portion of the glacier mass exists (and in fact may be thickening) in the lowest portion of the cirque basin. This appears to be due, in part, to cold air ponding behind a massive terminal moraine/bedrock complex, the product of a Little Ice Age advance. The terminal moraine extends across the cirque, varying in elevation from 40 to 65 m above the bottom of the cirque basin, forming an effective barrier to down glacier katabatic flow.

Temperature measurements were taken at 2300 and 0600 hours LDT in the middle of the summer ablation season (August, 1989). Temperatures were observed at 10 m elevational increments both up glacier and up moraine from the terminus. The results show values ranging from 6° C (43° F) at a point 40 m in elevation up glacier (and up moraine) to -3° C (26.5° F) at the terminus. As a consequence, the lower glacier experiences more frequent and harder freezes during the ablation season than does the upper glacier.

Visual reconnaissance indicates severe ice wastage in the upper regions of Conness Glacier--that area which would characteristically be considered the "accumulation zone". Conversely, ablation and mass balance measurements imply that decreased melting (or possibly even accumulation) takes place in the lower regions of the glacier or that area normally termed the "ablation zone".

Further evidence of this is demonstrated by the slope of the glacier. Glacier slope changes profoundly from an inclination of 11° at 30 m to 20° at 40 m above the terminus. This represents the largest single change in the slope profile from the terminus, 0 m, to an elevation of 120 m up glacier.

RECENT TRENDS IN POPULATION DISTRIBUTION IN GREAT BRITAIN AND THEIR RELATIONSHIP TO PATTERNS OF EMPLOYMENT CHANGE by A.G. Champion, Department of Geography, the University of Newcastle upon Tyne, NE1 7RU.

A key question in the counterurbanization debate is whether the shift of population and economic activity down the urban hierarchy constitutes a long-term shift to smaller, lower-density settlements (deconcentration) or a temporary transition to a new pattern of large metropolitan centres (regional restructuring). An assessment based on nine national case studies published in A.G. Champion (ed.) Counterurbanization : The Changing Pace and Nature of Population Deconcentration (London: Arnold, 1989) concludes that deconcentration remained a powerful force in the 1980s but that the scale of counterurbanization varied between countries according to the extent to which deconcentration trends were paralleled by the effects of economic restructuring.

This theme is illustrated by reference to the latest available information on population and employment change for the 280 Local Labour Market Areas of Great Britain, relating to the period 1981-87. It is shown that, following a slowdown in the rate of population deconcentration in the latter half of the 1970s, the pace of rural and non-metropolitan growth subsequently returned to higher levels. Though long-distance commuting increased substantially during the 1980s, there is found to be a strong correspondence between patterns of population growth and measures of work-based job growth. This is particularly noticeable in the 'Greater South East' of England, which led the recovery from Britain's deep economic recession of 1979-82.

The paper concludes by discussing what these observations mean for the relative importance of the two processes and by raising questions concerning the most appropriate spatial and temporal scales for this type of study.

THE "BLIND FLOW" OF POPULATION INTO GUANGZHOU CITY by Ka-yan Chan, Department of Geography and Geology, University of Hong Kong, Hong Kong

Urban inflow of population has accompanied industrialization in almost all countries during their early stages of economic development. China's urbanization trend and patterns after 1949 offers challenge since her degree of urbanization remains low after almost 40 years of development. By reconstructing the pattern of urbanization in Guangdong Province after 1982, the author examines if the pattern of migration and the influx of migrants into Guangzhou City during the Chinese New Year in 1989, which has shocked the Chinese government, is merely a magnified illustration of the inevitable process going on elsewhere in the world. By correlating the relationship between in-migration rate and employment structure, it is hoped that this paper can provide a guideline to assess the absorptive power of the urban employment market in the Guangdong Province.

CITY GROWTH IN POST-1949 CHINA: SPATIAL AND TEMPORAL DIMENSIONS by Kam Wing Chan, University of Hong Kong, Hong Kong.

Most of the analysis on China's urban growth so far has been confined to the national, aggregated patterns and policies because of data constraints. Much still awaits to be examined at a disaggregated level in a systematic manner. The paper attempts to fill this gap. Based on a relatively complete and consistent set of urban population data of some 200 cities in China, the paper examines the rates and variance of growth of these cities by region, size and function over various periods since the founding of the People's Republic. The observed patterns of growth are related to the attempt to "economize" on urbanization costs by the planners and the centralized nature of the socialist economic system. The paper provides fresh insights into the spatio-temporal dynamics of cities in post-1949 China.

EXPORT-ORIENTATION OF WESTERN NEW YORK MANUFACTURING FIRMS IN THE CHEMICAL AND MEDICAL SUPPLY SECTORS IN THE CONTEXT OF THE THE CANADA-U.S. FREE TRADE AGREEMENT by Bidhan Chandra, Department of Geography, State University of New york at Buffalo, Buffalo, New york 14260.

The geographic distribution, size and nature of new market opportunities, export orientation and likely future strategic responses of Western New York Firms in the context of the Free Trade Agreement (FTA) are discussed. It is hypothesized that smoother cross-border commercial relations between Canada and the U.S. should allow local industries to boost their export sales to Canada, resulting in an overall growth of the Buffalo regional economy. Research findings suggest that Canada is the most popular export destination at present. However, the share of exports as a percentage of total shipments is not significant for most of the exporting firms. The cross-border liberalization under the FTA is not perceived by most firms as a great opportunity for increasing exports to Canada. The Far East appears to be the main export target for new export initiatives. Any future export expansion in Canada is not seen as resulting from the FTA. This counterintuitive finding reflects the fact that many area firms have not fully evaluated the implications behind the FTA and that adjustment to the new trading environment has so far been limited. The time lag between the introduction of the free trade regime and the strategic responses of the firms implies that a long time might be needed for the theoretical expectations to converge with the realities of the situation.

THE INTERMEDIATE ECONOMIC DEVELOPMENT REGION: A NORTH CAROLINA CASE STUDY by J. Chang and J. A. Jones, Department of Geography and Planning, Appalachian State University, Boone, NC 28608

This study utilizes the concept and methodology of the spatial continua in defining socio-economic development regions. The main objective is to define, locate and assess the analytical relevance of the Intermediate Economic Development Region (IEDR). The IEDR is viewed as the significant linkage between growth nodes and peripheries, and it is expected that an enhanced understanding of its role and function in differentiating regional development will contribute to regional policy formulation focused on either regions of marginal development or dynamic growth. The study area consisting of the western Piedmont and mountain counties of North Carolina will be evaluated by such indices as commutation, income level, education level, etc. to define spatial graduations and linkages in a region of disproportional development.

CONCEPTUALIZING POPULATION SURPLUS: THE CASE OF REGIONAL PLANNING IN NORTHEASTERN BRAZIL by Jacquelyn Chase, Urban Planning, University of California at Los Angeles, Los Angeles, California, 90024.

The Superintendency for the Development of the Northeast (SUDENE) was formed in Brazil in the 1950s as the comprehensive and definitive solution to more than a century of regional stagnation punctuated by cycles of severe drought and rural exodus. A basic tenet of the SUDENE doctrine held that misery in the Brazilian Northeast was not a direct consequence of its inhospitable natural environment, but of political and economic structures which blocked development of the region. Induced industrialization became a central policy objective for eliminating traditional economic structures, rural power bases and endemic unemployment in the region.

Analyzing documents from the late 1950s through the 1960s, I show how three conceptions of surplus population within SUDENE served to justify the agency's industrial policies and hence to shape rural-urban relations in the Northeast. These conceptions were borrowed from Malthusian and dual-sector economic theories, and from sociological theories of migrant anomie. I argue that these notions ultimately deflected attention away from the diversity of agrarian structures and the reproduction of labor within the region.

SPATIAL DISTRIBUTION OF FEMALE WORKERS IN HIGH TECH INDUSTRIES IN MASSACHUSETTS By Lata Chatterjee, Dept of Geography, 675 Commonwealth Ave. Boston University, MA 02215.

Technological change is recognized to be a prime motor of regional economic development. However, the incidence of technological change varies not only geographically but also by class, race and gender. This paper analyses gender concentration in selected high tech S.I.C. categories in the various towns of Massachusetts. There is an uneven spatial distribution of gender concentration in these categories and the towns of Massachusetts are classified into three groups by the female-male ratio of employment. Explanation is sought for these varying patterns. The association between gender concentration and variables such as proximity to high tech employment opportunities, proximity to airports as well as quality of secondary schools and age composition are explored through regression models. The efficacy of these variables, commonly used to explain the uneven distribution of technological development in space, is tested for their usefulness in explaining female employment patterns in the high tech sector of Massachusetts.

FUZZY RELATION AND GEOGRAPHICAL DIVISION MODEL by Che, Yuhu, Department of Geography, Boston University, 675 Commonwealth Avenue, Boston, MA 02215.

This paper develops a division model based on fuzzy relation theory. An application of the model to regional environmental division is presented.

For establishing the division model, the paper introduces the mathematical definitions of relation, fuzzy relation, equivalence relation and fuzzy equivalence relation and discusses some theorems about them.

Based on the theoretical discussion a geographical division model is developed which consists of three parts: fuzzy clustering, fuzzy identification and adjacency adjudgement. Fuzzy clustering would classify the geographical units into several groups, in each of them the units would have similar properties. Fuzzy identification would identify which typical class each clustered group belongs to based on the closeness degree of fuzzy sets. Adjacency adjudgement would give the components of a class which are separate geographically based on graph theory.

A practical application of the model to the regional environmental division in the south-east suburb of Beijing City, China is described sequentially with the model developing.

This model would be helpful to computerized technique of geographical division.

AN ASSESSMENT OF PRE-EMPLOYMENT EXPECTATIONS AND EMPLOYMENT EXPERIENCES OF TRAVEL PROFESSIONALS by William H. Cheek, Geography, and Steve Illum, Leisure Studies, Southwest Missuri State University, Springfield, MO. 65804

Majors are chosen and careers entered for a variety of reasons. Earning potential, parental pressure, perceived demand, expected benefits, and even accident are part of the decision process. Graduates of many fields often enter professions and occupations only to find that job reality does not meet pre-employment expectations; travel-related employment appears to be one of these fields. Educators need to assist students in narrowing the gap between expectations and actual experience in their career choice. A survey of professionals in a variety of travel-related job titles was conducted in late 1988 to better assess differences in pre-employment expectations and actual job experience. This paper will emphasize differences by region, job title, and skills and training needed by those entering travel-related careers.

APPLICATION OF FUZZY SETS THEORY IN THE ANALYSIS OF POLLUTANTS FOR THE NEW YORK BIGHT by Ze-ming Cheng, Victor Goldsmith, Dept of Geology and Geography, Hunter College, 695 Park Ave., N.Y., N.Y., 10021

The New York Bight is an important natural resource for millions living in the densely populated areas which border it. The Bight receives large quantities of contaminants, and is one of the world's most heavily polluted open coastal water bodies. To effectively manage the environment of the Bight and its biological resources, it is essential that we quantify the relative contributions of critical contaminates and biological effects measured in the Bight. But the environment of the water body is a system affected by multiple fators and multiple variables, and the study of the environment is a combined procedure of subjective and objective analyses. Thus, it is difficult for classic mathematical methods to describe and analyse the water environmental problems. In this paper, the authors apply Fuzzy Cluster and Fuzzy Evaluation methods in order to determine the sources of the pollutants. Based upon these results, a series of suggestions for the control of the environment are put forwards.

THE FISHING PIERS OF COASTAL CAROLINA: A TRADITIONAL RESOURCE UNDER CONTEMPORARY PRESSURES by Ennis L. Chestang and Philip Shea, Department of Geography and Planning, East Carolina University, Greenville, North Carolina, 27858.

Fishing piers, the long narrow structures which protrude a thousand feet or more into the Atlantic Ocean provide venerable platforms from which countless generations of hopeful fishermen have cast their lures. The location of fishing piers is closely related to an integrated highway network. Particularly strong relationships exist to east-west highways which funnel traffic onto the barrier islands. Notable examples are Interstate 40 and N.C. 50 which converge on the Wilmington-Topsail Island region, U.S. 70 and N.C. 58 which dump traffic into the Morehead City - Bogue Bank area, and U.S. 64 and 264 which carry a heavy flow to Cape Hatteras-Nags Head vicinity. These highways provide access to the coastal zone for fishermen who can reach the area in two to twelve hours.

Most of the fishing piers situated in North Carolina have been privately owned and operated since their construction. The land in the immediate vicinity of each pier is, in most cases, owned by the pier operator. A typical development at the foot of a pier includes a motel, several dozen mobile homes, and usually a small number of overnight hook-ups for campers. Access to North Carolina's beaches, their boat ramps, swimming areas and other facilities is becoming more and more difficult to achieve. Land prices are escalating rapidly and creating a situation in which other uses are competing for fishing pier land.

This paper examines the development of fishing piers in North Carolina and the economic pressures that are changing the look of the land around them. The information contained in this paper was obtained from interviews in which a standardized form was used.

ENERGY INTERACTIONS IN STEP-POOL STREAMS by Anne Chin, Arizona State University, Tempe, Arizona 85287.

Although steps and pools are ubiquitous features in mountain streams, they have been relatively ignored in fluvial geomorphological research. Consequently, their nature and significance in the larger context of the fluvial system are incompletely understood. Most workers agree that step-pools perform a significant task of dissipating stream energy through vertical fall, yet it is not known the extent to which this is accomplished, and how the effectiveness varies spatially and temporally. The purpose of this study is to evaluate stream energy dissipation through step-pool sequences in a mountain drainage basin. A representative basin in north-central Arizona provided data at cross sections ranging in size from small tributaries to the main channel. Channel dimensions were measured and energy loss calculated through step-pool sequences in selected reaches within the basin. These measurements provide the basis for an evaluation of the spatial characteristics of stream energy at the basin scale. Preliminary results reveal a high degree of variability in energy loss both within and between study reaches, as well as with changes in stream discharge.

THE AFTERMATH OF THE FREE TRADE AGREEMENT by Quentin P. Chiotti, University of Western Ontario, London, Ontario N6A 5C2.

It has been suggested in the literature that to fully understand the agricultural section of the Canada-U.S. Free Trade Agreement, one also needs to understand its broader relationship with the GATT negotiations. The suggestion begs closer scrutiny, especially considering the contradictions that exist in the agreement. It is necessary to consider the broader relationship with GATT, and this paper presents the argument that there is potential conflict amongst provisions for (i) maintaining marketing board arrangements and stabilization programs, (ii) liberalizing market access for agriculture, and (iii) adhering to international obligations under GATT. Given these conflicts, it is not surprising that many producers and processors are currently in a state of uncertainty, as policy advisors and interest groups have recently shifted their attention towards negotiations and discussions concerning the decoupling of trade distorting policies.

Examples are drawn from the dairy and beef livestock industries in Canada to illustrate the potential impacts from the agreement and from the possible resolutions to the disputes currently under negotiation. The discussion attempts to: (i) identify contradictions in the agreement, (ii) examine the competitiveness of the production and processing sectors, and (iii) update the negotiations that have focussed on trade distorting policies. The overall argument suggests that there is potential for significant spatial and structural changes throughout the production process in both the dairy and beef livestock industries in Canada.

USING ROOTS DIGITIZING PROGRAM TO PRODUCE DATA NEEDED FOR LOCATION-ALLOCATION MODELING by Hsueh-cheng Chou, Department of Geography, SUNY at Buffalo, Amherst, NY 14260.

There are now several PC based software packages which can solve location-allocation problems. Usually, the digitizing function, which is needed to convert the information on the map into digital format, is not included in these packages.
ROOTS is a low cost digitizing and editing package for PC. ROOTS can output coordinates and topological data used by Odyssey. This informations can be used to produce data necessary to the location-allocation packages. A program written in C is developed to convert the Odyssey file format into a form which can be used by the location-allocation packages.

EFFECTS OF WEIGHTING FUNCTIONS ON SPATIAL AUTOCORRELATION by Yue-Hong Chou, Department of Earth Sciences, University of California, Riverside, CA 92521.

Recent development in vector-based geographic information systems enables testing spatial autocorrelation with large data sets. To use spatial autocorrelation for analyzing geographic distribution and spatial processes requires adequate specification of spatial weighting functions. This study examines the effects of selected weighting functions on the behavior of Moran's statistic of spatial autocorrelation. Five prominent factors are compared, including polygon area, distance between polygons, relative length of common boundary between adjacent polygons, area and distance combined, and boundary and distance combined. This study employs the database of Idyllwild, California. Geographic entities of the base map are defined by vegetation coverage. Areas of major wild fires form the study polygons. The result indicates conspicuous effects of weighting functions on spatial autocorrelation. While distance and combined distance-boundary increase the level of autocorrelation, other factors reduce it. Statistical tests suggest that unweighted contiguity provides the most significant spatial weighting function.

State Regulation and the Politics of Law in Localities: Legal Clinics in Hamilton and Toronto, by Vera Chouinard, Assistant Professor, Geography Department, McMaster University, Hamilton, Ontario, Canada L8S 4K1.

Recent research on the political economy of locality change has underscored the importance of conceptualizing and explaining the causes of geographic variations in processes such as class formation and class conflict in contemporary capitalism. A related challenge is to develop better explanations of the causes of geographic variations in the politics of state law. In this paper, I propose a Marxist theory of the politics of law in localities. Findings from case studies of struggles over state regulation of legal clinics in Hamilton and Toronto are used to illustrate this approach.

DEVELOPING A GEOGRAPHY OF GEOGRAPHIC INFORMATION by Nicholas R. Chrisman, Department of Geography DP-10, University of Washington, Seattle WA 98195

For too many years, the development of Geographic Information Systems (GIS) has assumed that the fundamental rules for system development can be derived from simple laws of geometry. The meaning of geographic information depends strongly on human culture. Production and consumption of geographic information varies dramatically around the world, and these variations do not always correlate with other groupings of world cultures. Yet, there is substantial regularity to the culture of geographic information.

Through an examination of various cultural differences, some common themes emerge. Some societies and organizations seek centralization and uniformity while others tolerate decentralization and local autonomy. The level of geographic scale where certain decisions are made varies and thus the nature of an information system must vary. Some organizations create tight secrecy while others survive with open access. On another dimension, societies vary in their treatment of the landscape. Some attempt to form nature to suit human purposes, while others tend to react to their natural setting. These variations will alter the purpose of a GIS. Software developed under one set of assumptions may not be useful under others. Developing a geography of geographic information will integrate the perspectives of a diversity of geographers and other mapping scientists.

WATERFRONT REGENERATION IN THE UNITED KINGDOM: THE EXAMPLES OF LONDON AND LIVERPOOL by Dr. Andrew Church, Department of Geography, Birkbeck College, London University, 7-15 Gresse Street, London W1.

Waterfront regeneration is occurring in all the major conurbations of the United Kingdom, usually as part of a policy initiative to revitalise depressed inner city areas. But the nature of this process and its effect on the local economic and social structure is varied. A comparison of the experiences of London and Liverpool identifies the key local, national and international causal forces that determine the form of change. In 1981 central government established a special regenerating agency, an Urban Development Corporation, in each of these areas. In London this state body is one factor that has led to major physical redevelopment and growth in the local economy. But the economic expansion is in three main sectors, financial services, retail and printing, and is the outcome of national and international restructuring. In both London and Liverpool there has been an attempt to use the waterfront location to attract investment in leisure and tourism but in Liverpool such initiatives are a response to the difficulties of attracting other industrial and commercial investment. The different experiences of Liverpool and London suggest that the nature of waterfront revitalisation is partly determined by structural economic changes and is not necessarily a repeatable redevelopment exercise. Also waterfront regeneration on its own, has not, as yet, proved an effective method of tackling inner city social and economic problems.

FORM BEFORE FUNCTION: THE MERITS OF PLANNING TORONTO'S REGION By Gardner Church, Deputy Minister, Greater Toronto Area, Province of Ontario.

Toronto's growth has been rapid but little planning and infrastructure has been put in place over the past fifteen or more years. The need for an urban structure plan is essential to decide where various activities and land uses should occur in the future. Once set out, investments in infrastructure funded largely by the beneficiaries of growth will follow. Hard choices will have to be made, but it will be obviously less expensive to organize ahead of change than to patch up afterwards. Toronto's history of strong management allows for optimism.

DIVERSIFYING THE RURAL ECONOMY - SOME EUROPEAN EXPERIENCES by Micheal O Cinneide, M.A., Ph.D., Department of Geography, University College Galway, Ireland.

The paper explores various local employment development strategies that have been deployed in European countries to counteract sustained decline in the agricultural sector. New constraints associated with reforms to the Common Agricultural Policy of the European Community, coupled with a desire to preserve the fabric of rural society, have focused attention on means of diversifying local rural economies. Disillusionment with exogenous approaches to the development of rural areas has led to increased emphasis on initiatives which are undertaken by the rural communities themselves. Empowering local communities (many of which are dispirited and depleted as a result of a long history of decline) to establish viable enterprises (very often in remote rural areas and thus create some of their own employment needs is proving to be a difficult task. Building local capacity represents a very sophisticated approach to development for which appropriate long-term support strategies are imperative if it is to attain its goals. An analysis of European experiences to date reveals mixed success. Whereas rural communities in the most underdeveloped (mainly Mediterranean) countries are still heavily dependent on traditional top-down regional development strategies, employment generation in more developed rural areas is increasingly becoming a more endogenous process.

URBAN DECLINE AND PLANNING POLICIES IN BRITAIN by David Clark, Department of Geography, Coventry Polytechnic, Priory St., Coventry CV1 5FB, U.K.

Urban depopulation is a widespread phenomenon in contemporary Britain. All the major cities are losing people. Growth is occuring at the fringe of city regions, in small freestanding centres and in rural peripheries.

The components of urban depopulation are analysed using census data. Depopulation is primarily a product of counterurbanization. It is compounded by low levels of natural increase of the urban population. The processes involved and the reasons for them are illustrated by changes in population in selected British cities. Population projections suggest that decline will continue, even accelerate. Pressure exists and will increase for the release of greenfield sites in the south of England, for urban development.

The implications of urban decline for planning policies are considered. Strategies for 'reviving', 'recapturing' and 'running-down' the city are outlined and evaluated. Although there are disadvantages, important social and environmental benefits are associated with decline. Obselete infrastructure can be discarded and cities can be remade at lower densities and to modern standards. The encouragement of further urban decline is advocated as a primary objective of urban policy.

THE DEMOGRAPHY OF HOUSING CONSUMPTION by W.A.V. Clark and Suzanne Davies, University of California, Los Angeles CA 90024

The relationships among households and the housing stock continues to be of central interest in understanding the nature of housing consumption because a full understanding of the operation of the housing market requires a much better grasp of the extent of the matching of households and houses over time. Indeed most models of mobility place this relationship at the center of the explanatory mechanism. Previous research has shown a strong link between space consumption before and after a move, and in the Dutch situation, that square meters per person is the most consistent predictor of the propensity to move. The same analysis of housing consumption using the American housing survey data reveals that the relationship is more complex than that suggested by the Dutch analysis and that in addition to controlling for age and size of household it is important to control for race and income.

RAINFALL INTENSITY, TRACTIVE COMPETENCE, AND BOULDER TRANSPORT IN SMALL, HIGH ENERGY DESERT WATERSHEDS, by A.O. Clarke, University of Louisville, Louisville, KY 40292

Three small drainage basins were studied in the Anza Borrego Desert, California. These basins range in area from 1.2 to 1.9 square kilometers, with maximum relief ranging from 245 to 636 meters. Stream channel gradients are quite steep, with bed slopes up to 0.157. The active channels of these basins are almost always dry, but contain numerous large stream-washed boulders with nominal diameters exceeding one meter.

A paleohydraulic model was developed in order to calculate the competent discharge required to initiate movement of the largest boulders. This model is based on the concept of critical shear stress. Discharge is estimated from calculated velocity and flow depth, and surveyed width. A form of the rational method is then applied to estimate the rainfall intensity required to produce this discharge. Necessary intensities are on the order of 20 to 60 mm. per hr. depending on boulder size, slope, basin area, etc. Such intensities occurred in 1976 with Hurricane Kathleen, and were confirmed by hourly rainfall data from surrounding stations. This intense rainfall was the result of a 100 year storm, and produced catastrophic flooding in the region.

URBAN AND REGIONAL MODELLING IN PRACTISE

Graham Clarke, School of Geography, University of Leeds,
LEEDS LS2 9JT

E-MAIL: GEO6GR @UK.AC.LEEDS.CMS1

ABSTRACT

The last five years or so have witnessed a burgeoning interest within the U.K concerning the role of urban and regional modelling for POLICY analysis and planning. There seems to be a number' of key strands to this development. First, researchers have made their models far more relevant to the needs of both public and corporate planners, both through the adaption of existing techniques and the adoption of new procedures, such as the marriage of account-based models and micro-simulation methods. Allied to this, has been the increased use of performance indicators which help to make the modelling results more USEFUL. The second major development has come within the fields of computer hardware and software, GIS in particular. These have made the outputs of models far more presentable (improved computer graphics, database management packages, user-friendly 'front end' software) and hence, understandable. The third major development has been the creation of new markets, in particular, the realisation that these techniques have a much wider applicability than the traditional large-scale planning models of the past. In the private sector these new areas would include financial services and the motor trade, whilst in the public sector there is increased interest in a variety of sub-system models (education, retailing, labour markets) to help monitor the effectiveness of urban policy management. Examples drawn upon work undertaken in the School of Geography at the University of Leeds will be used to illustrate these ideas.

ON THE COMPARABILITY AND STABILITY OF FRACTAL MEASUREMENTS FROM TOPOGRAPHY by Keith C. Clarke and Zong-Guo Xia, Dept. of Geology and Geography, Hunter College, 695 Park Avenue, New York, NY 10021.

The use of fractal measurements as descriptors of surface properties has seen broad acceptance in recent years. Several different methods have been used to compute these descriptors, and empirical investigations using the computational algorithms abound in the fractal literature. Recent studies, however, have shown that different fractal measurements can be derived from the same data, which implies "method-produced" error in fractal computations, and may invalidate most empirical studies conducted to date. This paper presents the results of an empirical investigation of method-produced error in the measurement of the fractal dimension. The study is limited to topographic data sets, which were synthetically generated to provide controlled test circumstances. Some large differences in the computed fractal dimensions were derived, and explanations, due to both numerical problems and theoretical limitations are investigated. We suggest that considerable attention should be devoted to technical limitations before conducting fractal analyses, and will present copies of computer programs developed to assist in more objective fractal measurements.

REGIONAL PATTERNS IN OCCUPATIONAL STRUCTURE: IS CONTROL DECENTRALIZING IN THE U.S.? by Brad Clay, 103 Bricker Hall, 190 N. Oval Mall, Ohio State University, Columbus, Ohio 43210-1361.

This study examines regional change in occupational structure to determine if concentration or deconcentration of economic control has occurred between core and peripheral regions of the U.S. in the 1980s. Second, this paper investigates whether routine office functions have followed the movement of branch plants to peripheral regions. A review of previous research shows conflicting and in some instances incomplete answers to these questions as a result of different methods of analysis.

This study employs a dynamic shift share analysis from 1984 to 1987 and shows that the North Central and Northeast regions experienced dramatic increases in occupations associated with control functions, primarily due to regional effects during 1986. Conversely, the South and West regions experienced minor gains of this type employment due to negative regional effects. Changes in routine office employment (i.e. secretarial, information processing) have been much less dramatic than changes in control functions in all regions, with the greatest gains in the South and West. A modified market penetration rate was used to make measures of relative regional change comparable. This measure reveals regional concentration of control occupations and deconcentration of routine occupations are stronger than absolute change suggested.

PLACES INVENT THEIR MAKERS: THREE SETTLEMENTS IN NORTHERN BRITISH COLUMBIA, 1830-1900, by Daniel Clayton Department of Geography, University of British Columbia, Vancouver, B.C. V6T 1W5

During the nineteenth century the human geography of the lower Skeena region - in north coastal British Columbia - was altered by three influential institutions: the Hudson's Bay Company (HBC), the Christian Church, and the state. Three settlements were created, within easy access of one another by water. The HBC established a fur trade post, the Anglican Church created a missionary site, and state laws and officials regulated a salmon canning town. All three settlements brought local native people into sustained contact with "whites," and HBC, missionary, and state practices had important impacts on native economies and societies. These institutions comprised a discursive triad that rotated around commercial monopoly, evangelical-humanitarianism, and property contract laws. However, the three settlements did not simply reflect these institutions. In part they constituted their underpinning discourses. Places are not just made, they also invent their makers.

JAPAN AND THE SOVIET UNION: THE NORTHERN TERRITORIES DISPUTE by J. Clements, Graduate Student, Department of Geography, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

Japan and the Soviet Union are still technically in a state of war over "the northern territories". The northern territories, otherwise known as the four islands of Etorofu, Kunashiri, Shikotan and the Habomai group, continue to impede normal Soviet-Japanese relations. The issue remains after more than forty years of bitter diplomatic conflict in a deadlock as each side persists in its claims of sovereignty over the islands.

Presently, Gorbachev's policy of prestrokia indicates possible concessions over the islands. The new Soviet policy aims at improving relations with Japan and moving toward more political and economic cooperation, allowing the Soviets to participate in the economic prosperity of the Pacific Basin. However, Japan remains steadfast to its non-negotiable, demand recognition policy, and opposition in the U.S.S.R. toward any concessions of the strategic islands hinders progress. Regardless of how the issue unfolds, it is certain that the past, present and future implications over the northern territories will ensure that it will remain a critical contemporary geopolitical issue.

PHYSICAL AND ECONOMIC ASPECTS OF RESOURCE SCARCITY: DIMINISHING RETIRNS IN THE U.S. OIL SUPPLY PROCESS, 1936-1987 by Cutler J. Cleveland, Department of Geography, Boston University, Boston, MA 02215.

The direction and magnitude of changes in the scarcity of crude oil is one of the most hotly debated topics in resource economics and energy policy circles. Analyses of historical and projected trends in the scarcity of oil, which tend to appear at times of real or perceived crises, figure prominently in issues of national security and the vitality of the economy. Meaningful forecasts of cost and supply conditions must be based in part on the causal mechanisms that generated the historical record. For many reasons, forty years of research on that record has not produced a consensus regarding the direction of change in returns to oil development or the causal factors underlying that change.

I clarify some of the confusion generated by the apparent contradictions of previous models by testing the hypothesis that the average cost of oil exploration, development, and extraction increased in the lower 48 U.S. between 1936 and 1987. Results of a multiple regression model show that average costs in all three stages of the oil supply process are inversely related to the rate of effort expended, and that significant long run diminishing returns are present in exploration and development. This suggests that the cost increasing effects of resource depletion have outweighed the cost reducing effects of increasing technical know-how in exploration and development. Average costs of extraction showed no long term trend. Results also indicate that the actions of the OPEC cartel significantly raised domestic costs, but only acted as a catalyst for rising domestic scarcity. Calls for massive drilling programs to stimulate domestic production and reduce import dependence must be balanced against the rising costs likely to be associated with them.

MORPHOLOGICAL SIGNIFICANCE OF TURBULENT CHANNEL FLOWS by N.J.Clifford Dept. Geography, Portsmouth Polytechnic, Portsmouth, England.

Bed material motion is determined by the magnitude and frequency of fluid stresses acting at the channel boundary and by the resistance of the material to these stresses. Explanations of motion should be sought in the spatial and temporal variability of boundary stresses, but is usually attempted on the basis of flow strength indices which represent time and space averages of the fluctuating flow properties.

Using electromagnetic current meters, a high frequency record of the turbulent velocity and stress field can be obtained. Frequency distributions of velocity and stress reveal periodic and 'event structures' in the flow, analagous to those observed under laboratory conditions.

Periodic and non-periodic phenomena in the flow provide the basis of a physically realistic link between flow, bedload transport and bedform structure at all scales in natural river channels.

RURAL GEOGRAPHY AND POLITICAL ECONOMY BY P. Cloke, St. Davids University College, Lampeter, Dyfed, SA48 7ED.

Over the last decade or so, geographers with research interest in social, economic and environmental aspects of rural areas have begun to mirror the attention paid in other sub-disciplines to the concepts and approaches of political economy. Although recent developments in rural geography as a subject denote a contemporary acceptance of the need for "applied" research, there has been some reluctance to base this application on theoretical advance. This paper discusses four interrelated themes which appear fundamental to any incorporation of rural research into the broader political and economy model: the specificity (or otherwise) of rurality and rural space; the nature of economic restructuring and social recomposition in rural areas: the power relations in the structuation of the extensive land market, with particular reference to agriculture; and the limit to state involvement in rural areas. Finally, the paper will speculate on the future of 'rural' as an analytical category within the umbrella of political economy.

SOCIAL RECOMPOSITION AND POLITICAL LEADERSHIP IN RURAL BRITAIN by P. Cloke, St. Davids, University College, Lampeter, SA487ED, Wales, U.K., and V. Cloke, Journal of Rural Studies, Lampeter, SA487ED, Wales, U.K.

Processes of social recomposition are of great theoretical and practical significance in understanding rural change and planning for its consequences. In Britain, for example, recomposition has emerged as a significant response and counter-response to capital restructuring, both shaping and being shaped by the relocation of capital in rural areas. This paper discusses the theory and practice of social composition in rural Britain focussing on three main questions: what is the relationship between capital and class in the recomposition of rural communities and how do resultant power relations affect the political leadership?; have changing government policies resulted in changes to the external state sector development of communities and if so what have these been replaced by?; and are new or revitalized agencies arising in the mediation of the shift from state sector to private sector in community development, and do these agencies represent a new genre of political leadership in rural areas?

NEIGHBORHOOD PARTICIPATION AND QUALITY OF LIFE IN HARRISONBURG, VA by Sharon Corkill Cobb, Department of Geology and Geography, James Madison University, Harrisonburg, VA 22807.

A recent trend in the social geography of the city is increased citizen involvement in urban planning and decision making. Research has shown that the attitudes of city residents are influenced by the degree to which they do participate in the current monitoring and future planning of their home environments. The city of Harrisonburg, VA (population 26,000) is indicative of this trend, having eight Neighborhood Associations, two loosely structured residents' groups and indeed a Neighborhood Coalition bringing all these organizations together. The major objectives of these organizations are to improve the quality of life for neighborhood residents, both by monitoring and preserving the neighborhood and by increasing resident involvement in city decision making.

A map showing the distribution and delineation of Neighborhood Associations will illustrate the extent to which Harrisonburg is covered by these groups. Photographs illustrating the varying cultural and economic landscape of the city will show that, at least through subjective analysis, the relationship between amount of public participation and level of perceived quality of life holds true.

This finding provides the basis for a more detailed disaggregate analysis of individual household attitudes and decision-making relative to public participation in city affairs and perceived quality of life.

THE HOUSING QUESTION AND CITY PLANNING IN INDONESIA: 1900-1940 by James L. Cobban, Department of Geography, Ohio University, Athens, Ohio 45701.

As with many countries in the world, in Indonesia at the end of the colonial period, a close relationship existed between efforts to improve housing conditions and the introduction of city planning. The rapid population increase of cities on Java after the beginning of the twentieth century brought with it overcrowding of residential areas. Among the many concerns of city governments was that of housing conditions particularly for the middle and lower income classes of all ethnic groups. Examination of Dutch records of the period shows that improving housing conditions went beyond concern for buildings and involved also the availability of building land, the furnishing of bank credit, enactment of building ordinances, control of the price and availability of building materials as well as the provision of infrastructure such as sewerage, drainage, refuse removal, and water supply. Satisfaction of these requirements became considerations in city expansion projects and were motives for the formal introduction of European city planning ideas into the Indies in the 1920s. Partly because of the depression of the 1930s improvement in housing conditions and adoption of town planning was not widespread before the advent of the Pacific War in the early 1940s.

NATIONAL DISTINCTIONS IN NORTH AMERICAN URBANISM, by William R. Code, Department of Geography, University of Western Ontario, London, Ontario, N6A 5C2

This paper first of all examines the extent of bi-national distinctions in the form and structure of North American cities, and then notes the considerable national differences in the paradigm within which the city is studied on either side of the Canada - United States border.

The view that the border represents the major continental division in the reality of urbanism has become conventional in Canada, (eg. Lemmon, Goldberg, Mercer). In this paper I suggest that the 49th parallel is but one divide out of several found in North American urbanism, and one which is not paramount.

Among students of the city however, there does exist a significant national contrast in the accepted paradigm of urbanism and urban process. This contrast is particularly evident in the field of Urban Planning. Far more so in Canada than the United States, are the remains of the British "Town Planning" tradition. Still strongly evident to the north are the elitist traditions of "Rational-Comprehensive Planning", where urban landscapes are deduced from fixed initial values. In the United States in contrast, the flexible epistimologies of Popper and Lindblom seem to hold greater sway, as does the attempt to analyze, understand and evaluate alternatives. Some of the distinctions between American and Canadian cities can be traced to this contrast in the dominant paradigm. Unfortunately, so can some of the problems of the Canadian city.

THE SPREAD OF AIDS TO RURAL TEXAS: CHANGING POPULATIONS AND DIFFUSION SCRIPTS by John Edwin Coffman, University of Houston, Houston, TX 77004

The AIDS epidemic began as a distinctly urban epidemic focused on Los Angeles and New York when it was first recognized in 1981. Moreover, the secondary spread was to a distinctive pattern of smaller metropolitan areas. Considering the long incubation period of the HIV virus, we are constantly measuring the results of epidemic patterns dating back as much as 7 to 10 years before the current AIDS diagnoses. The work of Gardner et al. at Walter Reed (1989) using HIV antibody test results from military inductees gives us an earlier glimpse of the progress of the infection, indicating strongly that the disease is now spreading to rural counties, especially in Texas.

The latest reports of AIDS cases shows that now the pattern even of diagnosed cases of AIDS is spreading into rural Texas. Preliminary sample testing results of interviews with three rural populations at risk (sexually active male homosexuals, HIV drug users, and prostitutes) indicates that the social scripts of each group in rural areas differ significantly from their more urban counterparts. Perhaps reflecting greater social conformity in rural areas, more bisexual activity among male homosexuals and less desire or availability for HIV antibody testing in rural areas creates new risk patterns among these groups. Now that the short-term prognosis for early (pre-symptomatic) detection and treatment of has improved markedly, it is imperative that modalities be constructed to allow the rural populations at risk for AIDS to take advantage of these improved prospects.

REGIONAL IMPACTS OF PROJECTED GLOBAL WARMING: RESEARCH CHALLENGES by Stewart J. Cohen, Canadian Climate Centre, Downsview, Ontario, M3H 5T4.

At regional and seasonal scales, projections of Greenhouse warming have been outside the global scale range of 1.5°-4.5°C for a doubling of carbon dioxide. In North America, much greater warming and generally higher precipitation are projected for high latitudes in winter, while mid-latitudes may experience drier conditions during summer. There is much uncertainty associated with these models, particularly in their ability to provide regional scale information. However, if such climatic changes were to occur as projected, what would be the implications at the regional scale? Answering this question requires a long-term commitment to various aspects of regional impacts research, including climate scenario development, regional studies and impacts modelling.

Although much has been learned from the growing literature on regional case studies of individual sectors, broader participation, particularly from geographers, will be needed in order to address the more difficult questions that will be encountered when attempting to do integrated regional assessments. This work would be interdisciplinary, involving such diverse fields as hydrology, agriculture, economics and political science.

IMPLICATIONS OF THE SERBO-CROAT BORDER IN YUGOSLAVIA by Branko Colakovic, Mankato State University, Mankato, Minn. 56002-8400.

There are few borders in Europe with so much conflicting claims as is the border between the Croats and Serbs of Yugoslavia. Due to frequent invasions and conquests, the peoples of the Balkans were forced to migrate and mix with each other. Both groups use mainly historical and ethnic distribution criteria in their arguments of territorial separation.

A series of maps will present the historical changes in state control and ethnic distribution, migration patterns and the lenghth of occupancy by each group. An analysis of the recent population census data by counties will be presented to see the current ethnic distribution. The population loses as a result of the Second World War will be taken into account, since some districts lost a lot of people, due to German and Italian occupation and the bloody civil war.

An attempt will be made to suggest a practical border between the two Slavic groups, keeping in mind their current population distribution and the ethnic distribution before the World War Two. On the basis of this border delineation, one can further suggest an administrative boundary between the Serbs and Croats and its territorial implications.

GLOBAL CHANGE DISKETTE PROJECT by Jeffrey D. Colby, National Oceanic and Atmospheric Administration, National Geophysical Data Center 80303, Department of Geography, University of Colorado, Boulder, Colorado, 80309.

This poster presentation visually depicts the basic components of the IGBP/WDC Panel/NOAA Global Change Diskette Project (GCDP). The GCDP consists of normalized vegetation indices that have been have been re-sampled and temporally composited to monthly values, and thematic data that have been compatibly formatted for global interactive analysis, with data quality control covering the continent of Africa.

The International Geosphere-Biosphere Program's (IGBP) Scientific Advisory Council approved an action plan developed by the Data & Information Systems Working Group of the IGBP and the ICSU Panel on World Data Centers. A key element of this plan is a Pilot Data Assembly Project for land surfaces data. Integration of data sets, both thematic data and vegetation indices derived from Advanced Very High Resolution Radiometer (AVHRR) satellite data is an integral component of this project.

One of the primary objectives of this project is to develop an awareness of, and an evaluation process for system and data requirements for Global Change applications. The hope is to engage the interest of scientists in third world countries to use such data sets for local and regional applications. Also, the enhancement of a distribution system for global data, and interaction of global change researchers is sought.

A CARTOGRAPHIC ANALYSIS OF CONTEMPORARY ENVIRONMENTAL ISSUES ON INDIAN LANDS by Daniel G. Cole, Handbook of North American Indians, NHB 85, Smithsonian Institution, Washington, DC 20560

The research for this paper is an extension of the data compilation conducted for the map in Richard White and William Cronon's chapter (Ecological Change and Indian-White Relations) of volume 4 (History of Indian-White Relations) of the Handbook of North American Indians. All information was gathered from published works as well as cartographic and textual records at the Bureau of Indian Affairs Office of Trust and Economic Development.

Indian reservations do not exist in an environmental vacuum. A variety of resources are exploited on Indian lands. Renewable resources such as lumber, fisheries and wildlife are harvested annually. Water resources from reservoirs are withdrawn for irrigation and other purposes on Indian and non-Indian lands. And non-renewable resources including fossil fuels and minerals are extracted. All of these and other activities have resultant associated problems: renewable resource depletion from overharvesting and poor management; flooding of lands behind dams; point and non-point pollution from sewage, mining overburden, and agriculture; and toxic waste storage and removal.

The author has mapped the distribution of resource use and resource problems on Indian lands across the United States. The resultant scenario reflects both the resource use and abuse of the entire country as well as the unique and varied environments within the Indian reservations.

REINVESTMENT AND REDEVELOPMENT: ARTISTS' NEIGHBORHOODS IN CHICAGO by David B. Cole, University of Northern Colorado, Greeley, Colorado 80639.

Many of the estimated 40,000 artists living and working in Chicago have found spaces in several industrial or commercial neighborhoods where empty buildings and cheaper rents exist. In most of these neighborhoods residential and commercial reinvestment is taking place, rents are escalating and displacement is occurring. Drawing from interviews with artists, property developers, city officials, landlords and community advocates, this study analyzes the diverse patterns of redevelopment that are taking place in Chicago's artists' neighborhoods. Economic, political, social and aesthetic issues are examined to identify key factors in neighborhood redevelopment strategies. Chicago has no ordinance at this time that protects artists' live/work space, and many are illegal. Normally near the center of the city, artists' neighborhoods have become prime targets for reinvestment by developers seeking locations where the rent gap is greatest. Redevelopment, however, is taking different forms in different neighborhoods and the conflicts over change vary. The following processes are at work: artist/developer cooperation, artist-financed development, artist/commercial/industrial cooperation. The city may become involved. Speculation is rife as landlords upgrade their properties in the residential areas and developers renovate large buildings for office or residential use. The gentrification frontier is pushing at different rates and in different forms into new areas of Chicago.

ILLINOIS RIVER POLLUTION CONTROL, 1900-1970: A CRITIQUE OF ENVIRONMENTAL HISTORY by Craig E. Colten, Illinois State Museum, Springfield, IL 62706.

Environmental historians have explored topics that should be of interest to historical geographers, and one example is stream pollution. Their research presents a vital chronology of the evolution of public policy and the forging of critical environmental laws. Unfortunately, they often equate the passage of legislation with effective pollution control. This policy-oriented perspective, however, seldom provides an adequate examination of actual environmental change due to human action.

Focusing on actual practices and environmental impacts presents a far different perspective on past environmental conditions. A review of Illinois pollution control legislation and the sequential installation of waste treatment facilities along the Illinois River reveals that between 1900 and 1970 there was a substantial lag between the enactment of legislation, the formation of regulatory agencies, the effective enforcement of policy, and finally, the moderation of stream pollution.

Pollution practices remained virtually unchanged throughout much of the Illinois River valley long after policy mandated, and technology made possible, cleaner urban effluent. Although legislation may indicate watersheds in attitudes about environmental management, a policy-oriented approach to environmental history renders an incomplete portrait of past environmental change.

GRAFFITI IN THE GHETTO by Malcolm L. Comeaux, Arizona State University, Tempe, Arizona 85287

Mexican-American neighborhoods are distinguished by the amount and visibility of graffiti. There is much purpose and meaning to this graffiti. It has meaning to the locals, and it is not done with the intent of vandalism. The writing of graffiti is done by gang members, and there is little variation among Southwestern cities--only the gang names seem to change. It is usually placed on the walls of public and semi-public buildings. Graffiti is most often seen near the core of a gang's territory, and asserts the gang's control over that turf. Graffiti is also frequently found along the edges of the gang's territory, and serves as a warning to other gangs.

Two types of lettering are found in Mexican-American graffiti. One is large block lettering that usually identifies the gang. This lettering is intended to be easily read. The other type is a highly stylized form of writing that gang members do not care whether others can read or not. It is usually used to list the names or nicknames of gang members. There are also a few symbols that have special meaning to all gang members. Each writer of graffiti attempts to develop a unique style, and any person skilled at this receives considerable recognition for his talent. Defacing of graffiti is considered an insult and is an indication of tension between gangs.

A COMPARISON OF SYNOPTIC CLIMATOLOGICAL CLASSIFICATION SCHEMES by Andrew C. Comrie and Brent Yarnal, The Pennsylvania State University, University Park, PA 16802.

All synoptic climatological studies involve the categorization of atmospheric circulation data; these groupings are then usually related to surface environmental variables. One of the fundamental problems in synoptic climatology involves the selection of classification procedure to be used.

In this study, six approaches to the categorization of synoptic data were compared to determine the relative merits of each in relation to a particular environmental scenario. Three forms of surface weather map classification were produced, including schemes based on subjective, sums of squares and eigenvectorial methods. Another technique, which used air mass characteristics and not weather maps, treated twenty-four variables by principal components and cluster analysis. Finally, methods based on map composites and circulation indices were developed. Each of the six procedures was related to surface ozone concentrations from the Pittsburgh, Pennsylvania area.

The results demonstrate the ability or inability of each of the techniques to relate particular atmospheric circulation variables, parameters or scenarios to the environmental problem. Recommendations are made for the appropriate situations in which to apply these synoptic climatological methods, including the suitability of more sophisticated, "high tech" approaches when simpler procedures will do.

REGIONAL VARIATION IN THE APPLICATION OF CLEAN WATER ACT STANDARDS by Daniel Conaty, San Diego State University, San Diego, California 92182.

In this paper, patterns of regional variation in the application of wastewater treatment standards under the Federal Water Pollution Control Act (Clean Water Act) are examined. The purpose of this research is to determine how consistently and equitably Clean Water Act standards under Section 301(h) of the Act have been applied across identified regions.

The Clean Water Act was amended in 1972 to require that all publicly owned treatment plants go to secondary wastewater treatment. In 1977, Congress added Section 301(h), which authorizes the Environmental Protection Agency Administrator to issue permits to coastal ocean dischargers who meet revised water quality standards.

Research conducted tests the relationship between treatment plant size, EPA regional location, and fiscal vitality of the municipality and the number of treatment works that have gone to secondary. This research required surveying treatment plant managers to help support the link between whether wastewater treatment facilities have gone to secondary treatment and factors which influenced this decision. Survey results are supported with case studies.

DYNAMICS OF OLD-GROWTH RED SPRUCE ACROSS NORTHERN NEW ENGLAND: RECONSTRUCTION FROM TREE RINGS AND STAND ANALYSIS by Laura E. Conkey, Department of Geography, Dartmouth College, Hanover, NH, 03755; MaryBeth Keifer, Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ, 85721; and Charles V. Cogbill, RFD 2, Box 160, Plainfield, VT, 05667.

Nine red spruce stands across a SW to NE gradient from the Adirondacks (NY) to north-central Maine are evaluated with tree core samples to determine growth rates and exact ages, and by tabulating and mapping live and dead stems. A compilation of these data enables us to reconstruct the history of each stand and the interactions of the individual trees. Recruitment and mortality histories of each stand vary according to local conditions and disturbance, but some generalized observations are possible. Most of the stands have never been logged, and seem to have been free of major fire and windthrow events. Insect infestation has repeatedly occurred at some of the sites; such events in Maine, for example, may have happened in the 1810s, 1870s, 1910s, and 1970s. Tree ages range from seedling to 380 years in age, with the majority in the older age classes; clusters of establishment occur in the 1730s, 1820-30s and at the turn of this century. Stand-wide growth rates indicate periods of suppression in common to all stands occurring in the 1910s as well as in recent years; other periods of suppression and release are specific to individual stands and trees. Individual growth patterns draw a complex portrait of the stands that are influenced by macroclimatic events (e.g., Conkey 1986) as well as stand specific tree-falls and competitive interactions, and are mediated in large part by spruce budworm infestations, minor windthrows, and possibly air pollution effects. A combination of exact tree-ring dating and reconstruction of mortality events through stand analysis contributes to the understanding of long-term stand dynamics and individual tree to tree interactions that help explain current aberrations in growth.

THE SUCCESSIONAL STATUS OF LAKE KATHARINE STATE NATURE PRESERVE, OHIO, by Kathleen M. Connolly, University of California, Los Angeles, CA 90024.

Lake Katharine State Nature Preserve is located in the area of highest botanic diversity in Ohio. The geologic history of the area has been partially responsible for this diversity. It is periglacial and is within the Taeys River system. Human influenes on stand composition have included heavy impact by agriculture and especially by logging to supply charcoal for iron smelting from the 1850s to the early 1900s. In view of the area's history, I wanted to establish the successional status of the preserve and to evaluate the effect of vertebrate herbivores in forest gaps.

By comparing early nineteenth century survey records to current stand composition, I determined that the preserve is undergoing successional change. To assess the role of vertebrate herbivory in the process of succession, I used paired, $1 \ m^2$ open and closed plots within gaps and underneath closed canopy. By comparing species, height and number of branches per seedling in the plots in 1987 and 1988, I found browsing was rare and appeared to be insignificant in affecting which seedlings would reach canopy status.

EMIGRATION: THE CARIBBEAN ALTERNATIVE TO ECONOMIC HARDSHIP AND ECONOMIC MISMANAGEMENT UNDER RESTRUCTURING by Dennis Conway, Indiana University, Bloomington, IN 47405.

The Caribbean region as a whole has come under the hegemony of North America. The interrelations developed within this sphere of influence have led to an accentuated state of interdependency of the Caribbean peripheral states during the 1970s and 1980s, where few of the small insular economies are not troubled by balance of payments problems, indebtedness, capital flight and stagnating economies, among other problems. Negociations with 'private' international capital, with the IMF and via bi-lateral negociations with donor-countries, such as the United States, Canada and the EEC, have invariably brought national governments, like Jamaica, Guyana and Trinidad and Tobago to the point where restructuring imperatives are mandated.

While governments are faced with the task of placating their populous to accept unpopular and harsh national stringency measures, the people have alternative strategies available. International mobility is such a tradition among all classes of Caribbean people, that emigration is always a behavioral option, whereby the economic mismanagement of past governments and the stringent policies of the restructuring government are likely to prompt a mass exodus of vital human resources. Evidence is presented of Caribbean mass exoduses from the recent-past to exemplify this hypothesis. Contemporary conditions in North America also favor continuation of relatively high immigration volumes from Caribbean sources; in spite of the current concerns over controlling immigration in the United States and Canada.

NEW CONTRADICTIONS FOR THE NATION-STATE by Philip Cooke, Dept. of Town Planning, University of Wales, Cardiff CF1 3YN, United Kingdom

A characteristic feature of the modern era has been the formation of nation states. National struggles have inscribed their effects upon the global map in even more profound ways than other social struggles. The parcellisation of territory enforced by the drawing of national boundaries has had profound effects on the structuring of social and economic space. The powers embodied in nation states have had equally distinctive effects upon the internal structures of national territories, not least in the efforts to homogenise diverse regional cultures.

As the powers of nation states begin to weaken in the face of global economic forces, and an increasing number of nation states seek membership of supranational economic (and conceivably in future political) communities, questions are being posed about the viability of the old idea of the nation state. Does it increase its still substantial powers of control in a downward direction as its external influence weakens, as has happened in the UK? Or does the dimunition of centralised sovereignty encourage the renaissance of regionalist struggles, as has occurred in the Soviet Union? The changing nature of the nation state poses a new and interesting agenda for geographical analysis.

KING ST. E.
226
SHERBOURNE ST.
63

ACCESSABILITY TO EMPLOYMENT OF CENTRAL CITY RESIDENTS: THE CASE OF THE URBAN MIDWEST. By Thomas J. Cooke and J. Matthew Shumway, Department of Geography, Indiana University, Bloomington, Indiana 47405.

The decentralization of urban employment and the economic restructuring of the U.S. economy are believed to have reduced local job opportunities for central city residents. These residents may be spatially restricted and prevented from commuting to appropriate jobs because of a limited information network, the central location of public housing, and a transportation system which is not suited for reverse commuting. One hypothesis is that the combined effect of job decentralization and the above factors reduce accessibility to employment for central city residents as measured by travel time to work. This hypothesis is tested by estimating a model of the survivor rates for the travel time to work in the largest urban areas of the American midwest. The model is used to examine the effect of location and individual factors on commuting times.

SKI RESORTS OF THE NORTH AMERICAN WEST: VAIL AND WHISTLER AS PLACES TO LIVE by Kate Cooksley, Simon Fraser University, Burnaby, British Columbia V5A 1S6, and Rudi Hartmann University of Colorado, Boulder, Colorado 80309-0260.

Vail, Colorado, and Whistler, British Columbia, represent outstanding examples of instant resort towns in the Rocky Mountain West. While many similarities exist between the two resorts, however, there are also significant differences. Whereas Whistler achieved municipal resort status in 1975, Vail was incorporated as early as 1966. The authors maintain that Whistler is at a stage of development which Vail has already experienced, and a comparison of the two destination resorts is thus useful.

Such an examination includes a review of resident attitudes in the respective resort communities. Findings from field research in Whistler, and citizen surveys in Vail, suggest that preserving quality of life is viewed as importantly as the economic benefits derived from tourism. Various management issues facing the resorts at their respective stages of development are addressed in light of creating a desirable living environment.

RESOURCE EXTRACTION AND AGRICULTURAL PRODUCTION, TAHUAYO RIVER, PERUVIAN AMAZON by Oliver T. Coomes, Department of Geography, University of Wisconsin, Madison, Wisconsin 53706.

The rural economy of Amazonia remains little studied despite its relevance to regional development and efforts to conserve the resources of the rainforest. Recent literature indicates that non-native peoples of the region, particularly ribereños/caboclos, draw on a wide variety of resources to secure their livelihood: while most practice subsistence agriculture, some extract timber, rubber, or tree fruits/nuts for the market. Others raise annual or perennial crops to sell; some farm the floodplain and levee tops, while others depend on upland fields. Such diversity has made generalizations about the rural economy difficult and limits our ability to address a number of broader issues in Amazon development.

This paper presents the results of a large-scale survey conducted to identify patterns of forest resource extraction and agricultural production among rural communities along the Tahuayo River, a blackwater affluent of the Amazon near Iquitos, Peru. Approximately 85% of the households in the basin were contacted in 15 ribereño communities, two recently formed colonies (one planned, the other spontaneous), and one Indian community. Basin-wide estimates are made of the quantity and value of products sent to market. The relative importance of extractive versus productive activities and of specific products in the economy of the region is assessed. Hypotheses are formulated from associations between patterns of household production and demographic, historical, and financial characteristics to explain product specialization and differentiation among communities of the region. Implications for future studies of the rural economy in Amazonia are discussed.

SMALL-HOLDER AGRICULTURE IN SEMIARID KENYA by John D. Corbett, Department of Geography, University of Minnesota, Minneapolis, Minnesota, 55455.

Population is growing rapidly in Kenya and food production is not keeping pace. This study investigates the special problems and opportunities faced by resource-poor farmers in semiarid Kenya. The specific problem concerns the detrimental effects of soil erosion on agriculture where farmers have limited conservation resources, rainfall erosivity is high, and land use intensity is increasing. Agricultural production in Kenya's semiarid lands is limited by many environmental factors. Small-holder farmers also face severe resource access problems. This paper presents an analysis from a sample of farmers in Kenya who face a variety of resource constraints and environmental limitations.

MARXISM, POST-MARXISM AND THE GEOGRAPHY OF DEVELOPMENT by Stuart Corbridge, Cambridge University, Cambridge CB2 3EN, England.

This paper reviews recent debates in radical development geography and seeks to defend a distinction between Marxist and post-Marxist approaches to the subject. Discussion touches on concepts of causality and determination, on the primacy of the economy, on theories of agency and power, and on questions of political strategy, morality and justice. The last issue is examined more carefully and illustrated with examples drawn from the Third World.

INTEGRAL RURAL DEVELOPMENT: THEORY AND REALITY by Hildegardo Córdova Aguilar, Pontificia Universidad Católica del Perú, Lima, Perú, and The University of Vermont, Burlington, Vermont 05405

Policies of rural development have become of common use by different governments in the Third World. However, the concept of rural development is not the same. It varies according to time, strategies and tools. Developmental specialists such as economists sociologists, agronomists and geographers disagree not only about whether this should be done top-down or grassroot, but also on their own views of the problem. Discussions on these experiences are intended by referring to a project on integral rural development in the highlands of Piura, Northwestern Perú, under the responsibility of the Center for Research in Applied Geography of the Catholic University of Perú.

This grassroot-type project is designed to work with a population of 80,000 people, of which about 90 percent are at a subsistence level. The area covered is 2,000 km^2 that extends from 300 to 3,600 m of altitude. Development strategies include basic research on the natural resources and their potentialities for development. At the same time, there is a program of workshops on environmental education to teachers and peasants to raise their sensitivity toward the surrounding ecosystem and its management, as well as to get the people involved in the solution of their own problems.

DETERMINANTS OF DEVELOPMENT SUCCESS ON UNITED STATES INDIAN RESERVATIONS by Stephen Cornell, Department of Sociology, C-002, University of California, San Diego, La Jolla, CA 92093, and John F. Kennedy School of Government, Harvard University.

This paper reports findings to date of the Harvard Project on American Indian Economic Development, a three-year effort to analyze the conditions under which self-determined economic development can be successful on United States Indian reservations. The paper describes four major factors or categories of factors that appear to be important: control (de facto sovereignty), institutional capacity, resource endowments, and strategic choice. These factors in turn are substantially modified by external political and economic constraints and internal sociocultural variables. The argument is illustrated with reservation case materials.

VERBAL DIRECTIONS FOR WAY-FINDING: WHY SHOULD WE CARE? by Helen Couclelis, University of California, Santa Barbara, California 93106.

Recent work in psychology and linguistics has shown that natural language offers privileged access to the study of spatial cognition. I argue that verbal directions for way-finding provide natural, easily-accessible protocols for the investigation of several issues relating to cognitive maps and spatial problem-solving: the translation between image-like and verbal representations of space; the question of necessary vs. sufficient information for way-finding; the relation between language and the geometry of large-scale environments; the issue of non-propositional (image-based) inference; the role of landmarks in spatial thinking; etc. My own research in the area focuses on the errors people sometimes make in giving directions. Such errors can reveal a great deal about the workings of the underlying mechanisms of spatial cognition as well as the nature of the associated cognitive maps. Beyond their theoretical interest, the findings should be relevant to the development of linguistic interfaces for GIS and for special-purpose automated navigational systems.

CARTOGRAPHIC INSTRUCTION AND THE SMORGASBORD CURRICULUM; THE CASE FOR A FOUNDATIONS COURSE IN GEOGRAPHIC TECHNIQUES by Michael R.C. Coulson, Dept. of Geography, The University of Calgary, Calgary, Alberta T2N 1N4

Cartography is again being required to fight for its position within the "required core" of geography. The discipline has evolved and expanded while the number of courses required for a bachelor's degree has remained essentially unchanged for at least forty years. Within the techniques section of the subject Cartography has had to face the quantitative "revolution", the blossoming of Remote Sensing and more recently the surging development of Geographic Information Systems. The result has been the fragmentation of the core curriculum. There is an overcrowded smorgasbord of course offerings, but the student is left with serious gaps in his knowledge and ill-prepared for the wide range of practical tasks required in his geographic career. This is a sad and dangerous state of affairs: it is also unnecessary.

The peculiarly geographic techniques of Cartography, Remote Sensing, Quantitative Methods and G.I.S. are intertwined in their problems and objectives. It is time that we reflected these associations with a foundation course in geographic techniques that introduces and reflects the basics of Cartography, Remote Sensing, Quantitative Methods and Geographic Information Systems. While such courses may need rather careful structuring and stretch the limits of expertise for an instructor it will eliminate needless repetition of basic information, provide a comprehensive foundation for students to build upon and free-up space in the curriculum for later meaningful specialization. The latter part of the paper provides examples of content for such an integrated course.

GIS AND CLASSICAL LOCATION THEORY by David J. Cowen and W. Lynn Shirley, University of South Carolina, Columbia, SC 29208

Geographical Information Systems have found an important role as, private and public sector decision support and management tools. However, if Geographical Information Systems are going to successfully meet the needs of the geography community they must be able to respond to the classical location theory problems that are the foundation of our discipline. One gauge of the status of the field is to examine the ability of the spatial analysis tools that are found in current state of the art systems to handle such problems. This paper explores the fundamental spatial operations that are required to implement some classical locational models and the series of data bases and functions that could be utilized to handle them within a GIS environment. The paper will discuss the appropriateness of the vector and raster data models for such problems. The findings will be based on experiences gained from a major infrastructure and economic project that is underway in South Carolina.

A LOOK AT MIGRATION PATTERNS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE MOBILE ELDERLY VETERAN POPULATION. by D. Cowper, Health Services Research and Development, Department of Veterans Affairs, Hines VA Hospital, Hines, Illinois, 60141.

This paper presents results from a study entitled, "Migration Patterns of the Aging Veteran," funded by the Department of Veterans Affairs (Project #85-028). The major objectives of the study are: 1) to determine the migration patterns of aging veterans and to examine the socio-demographic characteristics of migrants into and out of selected states, 2) to incorporate findings about the mobile veteran population to see how demand for VA health services is affected by this special sub-population, and 3) to suggest ways in which VA planners can more accurately predict the demand for health care services generated by the elderly veterans in their area. Difference of means tests are employed to detect differences between in and out migrants by state, and regression equations assess the amount of variation in health care demand which can be attributed to veterans' socio-demographic characteristics. Research findings include: 1) certain states are more attractive to elderly veterans, both in the sheer volume of veterans they attract, and in the highly selective socio-demographic and economic types of veterans they attract and 2) knowing the numbers of veterans entering an area is not enough to gain accurate estimates of what impact they will have on the demand for VA health care.

IMPACT ON RURAL COUNTIES OF NONEMPLOYMENT INCOME. by Ron O. Cox and Bruce Pigozzi, Department of Geography, Michigan State University, East Lansing, Michigan 48824-1115.

Nonemployment income (property and transfer income) presently comprises about one third of the total personal income within the United States. The role of this important source of personal income is examined in the rural areas of the U.S. by examining the nonmetropolitan, nonadjacent counties. These counties tend to be the areas where nonemployment income comprises the largest percent of total personal income. In utilizing an economic base approach, a combination of location quotient and a priori assumption is used to allocate portions of the economy to either the exogenous or endogenous sectors. Multiple regression is employed to produce differential multipliers which are used to examine the impact of the components of the basic sector upon the nonbasic sector.

CONTEMPORARY POLYGAMOUS LIFESTYLES WITHIN THE MORMON CULTURE REGION: FUNDAMENTALISTS AND NEO-FUNDAMENTALISTS by Clifford D. Craig, Utah State University, Logan, Utah 84322-5240.

Recent surveys indicate that the number of individuals living lifestyles akin to the traditional notion of polygamy is on the rise in the Western United States, and the majority reside within and near the State of Utah. The practice of cohabitation is on the increase and is appearing in a variety of forms and for differing reasons. In 1890 the Mormon Church officially abandoned the practice of polygamy; however, spread through the American West and into Canada are numerous towns where various forms of polygamy are being practiced today. Polygamous families are thriving within the larger urban areas as well as in rural communities outside the Wasatch Front. This research attempts to shed light on the dynamics, spatial distributions, and approximate magnitude of both the "neo-fundamentalist" and "fundamentalists."

The Mormon (LDS) Church neither condones nor accepts polygamy as part of official church doctrine, but estimates of the size of the practice fall between 10,000 and 30,000 people. State and federal laws have been nearly impossible to enforce against polygamists, due in large part to the unique cultural composition of the region in which it is practiced along with the turmoil, costs and problems associated. Public understanding of modern Mormon culture and contemporary polygamous practices are, for the most part separate and distinct lifestyles

LAND USE PROBLEMS ASSOCIATED WITH ORGANIC SOILS by Jane L. Craig, The University of Akron, Department of Geography, Akron, Ohio 44325.

For effective land use planning, the limitations of organic soils must be taken under consideration. While there are several viable uses for these soils, they are not suitable for building construction, without extensive and expensive adaptations. This poster will illustrate the problems encountered when McDonald's decided to build a restaurant on an area of Carlisle muck. The unstable organic material was unable, at times, to support even the excavating equipment, and the poor drainage caused extra delays in construction. Traditional methods of excavation were unable to be used, consequently added expense was incurred to overcome these problems. Removal of the organic material, down to the clay base, was required before backfilling with sand/clay fill. After backfilling this material needed to be throughly compacted before any construction could begin. These problems serve to show the costs which could have been avoided if the restaurant had been built on soil with fewer limitations. The poster will further illustrate the recommended uses for organic soils and how they may be productively incorporated into a land use plan.

DROUGHT RELATED RIPARIAN FOREST COLONIZATION ON POINT BARS by Mary R. Craig, Department of Geography, University of Iowa, Iowa City, Iowa 52242.

The recent drought in Iowa and the consequent decline in river stage and emergence of point bars has provided a unique opportunity for the study of riparian forest colonization and establishment. This study analyzes the relationship between plant population processes and sedimentological and topographical factors. Vegetation along the Cedar River, Iowa was sampled from 144 one meter square quadrats along randomly chosen, surveyed transects. I determined the density, basal area in size classes, and mode of establishment (seedling or sprout) for individuals of woody species. Sediment sequences were described and evaluated for percent organic matter and particle size composition. Point bars along the Cedar River, Iowa are colonized simultaneously by four riparian species: Salix interior, Salix nigra, Populous deltoides, and Acer saccharinum. The abundance and population structure of each species is evaluated in relation to topographical position and sediment deposition.

THE ACQUISITION OF EXPERTISE IN A DISPLAY-BASED CONTEXT: THE ROLE OF CARTOGRAPHIC SKILLS by Jeremy Crampton, Department of Geography, The Pennsylvania State University, University Park, PA 16802.

Cartographers have long been interested in understanding how their graphics should communicate with the user (e.g., the cartographic communication model). Only more recently however, have they concentrated on how maps are typically used, as opposed to normative models and guidelines of how they should be used (see Crampton & Daggs, 1989).

I argue that by approaching graphics from the user's perspective, instead of focussing on "parts" of the graphic (e.g., effectiveness of proportional circles, or lettering placement), a "holistic" and ecologically valid understanding of map use is possible.

I have investigated how users of visual displays such as maps acquire expertise with those displays. Previous work by cognitive psychologists has found that the use of simple graphics makes problem solving easier and less prone to error. However, there is still little investigation of the acquisition of expertise in a mapping context. Does expertise with maps increase ability to solve spatial problems in general? Can previous experience with a map of an area increase wayfinding performance? If so, how easy is it to acquire expert traits? What is the nature of mapping expertise?

It is very important that cognitive psychology (expertise acquisition) and cartography (graphic use) be combined to answer these questions. In this way human spatial problem solving such as wayfinding and map use can be aided.

IT'S SHOWTIME: NOTES ON THE SOCIAL SITUATION OF WAITING by P. Crang, Department of Geography, Cambridge University, Cambridge, CB2 1EN, Britain.

In this paper I will put forward some thoughts on four themes: the interaction of class, race and gender, and their combination in particular social situations; the nature of unskilled, flexible service employment; the importance of workplace geographies in understanding such employment; the nature of the contemporary service relation.

I will focus on the case of waiting employment, drawing upon participant observation in one restaurant in Cambridge, Britain, which promotes itself as a theme restaurant.

I will conclude, firstly, that this particular labour process cannot be understood outside of other social relations beyond those of class, particularly gender and race. These do not only act by distributing individuals to occupational places but, in this case, can define the nature of the occupation. Secondly, I will argue that the tip or gratuity has a vital role in understanding this work. Thirdly, I will suggest that the labour process itself involves complex negotiations over autonomy, not simple deskilling.

THE CHANGING GEOGRAPHY OF HIGHER MEDICAL EDUCATION IN THE USSR by P. Craumer, Department of International Relations, Florida International University, North Miami, Florida 33181, and E. Cromley, Department of Geography, University of Connecticut, Storrs, Connecticut, 06269.

The Soviet Union has a physician/population ratio considerably higher than those in most industrial and post-industrial nations. This accomplishment is the result of a net increase in physician supply of more than 1 million doctors since 1917. Given the growing interest in Soviet medical care organization, it is important to understand the system for producing physicians. This research examines the temporal and spatial patterns of Soviet medical institution development (including university-based medical schools) from 1917 to the present. The pattern of development is evaluated against levels of physician availability for different time periods.

The results of the analysis show distinct clustering in medical school formation during the period from 1917 to 1959. Except for university-based institutes organized in certain ASSRs, there has been very little expansion through the addition of new schools since 1959. The results suggest that the higher medical education system has been developed to provide broad regional and ethnic coverage rather than to enhance local physician supply in underserved areas.

THE NABATEAN GEOGRAPHICAL DOMAIN DURING INTERTESTAMENTAL/NEW TESTAMENT TIMES by Bruce R. Crew, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53201

The first known appearance of the Nabateans as a historical-geographical entity in the Ancient Near East occurred late in the 4th Century B.C. in the writings of Diodorus of Sicily. During the next four centuries, they became a political and economic power in the region until their decline and eventual annexation in 106 A.D. by the Roman emperor Trajan. Their capital city lay at the ancient site of Petra in the mountains of Edom in southern Transjordan. Their geographical domain at its peak included the areas of northwest Arabia, the Negev and Sinai deserts, and a large portion of the highlands in Transjordan as far north as the city of Damascus.

This paper entails an examination of the Nabatean kingdom and its geographical domain during Intertestamental and New Testament times via written sources and archeological evidence. The paper will first show that the Nabateans' political power and wealth resulted primarily from their control of the major trade routes at key locations in the region. Second, it will emphasize the role of its vast desert as a geographical barrier to Roman efforts to conquer them by military force. Third, it will look at the political and geographical strategy employed by the Romans which eventually proved successful in subduing them. Finally, it will explore the historical and geographical impact of the Nabateans upon events in Isral-Palestine during the above periods.

THE ADVERTISER AND THE ARCHITECT:REMAKING THE IMAGE OF THE LONDON DOCKLANDS by Darrel Crilley. Department of Geography, Queen Mary College, London E1 4NS.

The dramatic transformations underway in the London Docklands are the subject of an expanding geographical literature, but few of these studies have pursued in any depth or detail the importance attached to the mobilisation of a powerful urban imagery. Seeking to rectify this imbalance this paper will examine how the activities of design professionals and the efforts of marketeers are conjoined to recreate the image of the Docklands. It begins by taking a brief look at how the built environment and an expanding cultural infrastructure are utilised pro-actively in the redevelopment process. Following on from this, attention focuses on two key components of what may be termed 'symbolic production'. First, I note the importance attached to marketing and advertising by both the LDDC and independent 'place entrepreneurs' before concentrating upon the images of place delineated in a range of advertisements for residential schemes throughout the area. Closely related to this, the work of architects in shaping the ambience of place will be illuminated. The evolution of a predominantly historicist, post-modern aesthetic is charted and a tentative interpretation of its underlying rationale offered. It is argued that this is to be found not only in the endeavours of architects to fashion an appropriate aesthetic response to the current postmodern sensibility, but also has a material basis in the changing role of the architect in the production of the built environment.

A CONSTRAINED SHORTEST PATH MODEL FOR SIMPLIFYING ENCODED LINES by G. Campbell, Department of Information Management, University of Connecticut, Storrs, CT 06269, and R. Cromley, Department of Geography, University of Connecticut, Storrs, CT 06269.

Line simplification is an important spatial operator used to eliminate unnecessary detail in cartographic data. Many heuristics have been implemented to simplify encoded lines, but none specify a priori how many line segments to retain while optimizing some desired geometric property of the encoded line. A constrained shortest path problem is formulated to model this type of line simplification and a Lagrangian-based algorithm is used to solve it. Issues associated with implementation of the algorithm are addressed using an encoding of the Connecticut coastline containing over 1000 points.

1988 DROUGHT IMPACTS AMONG WISCONSIN DAIRY FARMERS by John A. Cross, University of Wisconsin-Oshkosh, Oshkosh, Wisconsin 54901.

Wisconsin farmers experienced drought conditions during summer 1988 resulting in the loss of half the state's hay and corn crops. Dairy farmers, representing 49 percent of all Wisconsin farmers, faced feed shortages during the winter and spring of 1988-89. Data about the impacts of the drought, drought perceptions, and drought mitigation efforts were obtained from 283 Wisconsin dairy farmers who responded to a mail survey in late spring 1989. Agricultural extension agents were surveyed in both September 1988 and May 1989.

Nearly 1,000 Wisconsin farmers ceased dairy operations as a direct consequence of the drought. Nearly a quarter of the dairy farmers receiving drought assistance payments indicated that they could not have remained in operation without it. Over three-quarters of the surveyed dairy farmers were forced to make hay and/or feed grain purchases because of the drought and 38 percent reduced the size of their dairy herds. Although mean net farm income was down 15 percent, over a tenth of the farmers reported above average incomes during 1988. Although the drought was felt throughout Wisconsin, regional variations in the severity of the drought and the farmers' responses to it were also discerned.

ADMINISTERING THE HALLS: ENGLISH LOCAL GOVERNMENT AND THE REGULATION OF MUSIC HALLS IN THE 1890's by Andrew Crowhurst Department of Geography, University of Cambridge, England.

The 1880's saw the development of a nationwide music hall industry, and also a major reorganisation of the institutions of English local government. The aim of my paper is to examine the changes which these concurrent trends wrought in the regulatory framework of public entertainments, and the effects these changes had on the power relations between proprietors, councillors and social reformers.
The newly constituted councils combined a traditional mistrust of popular recreations with a novel credo of state intervention, supported by the self-confidence born of their democratic nature. Control over music halls was not to be strengthened through the stricter implementation of their existing powers, but through its reinterpretation. The 'judicial' responsibilities which the magistrates had held were to be replaced by the 'administrative' control of local council licensing committees. As directly-elected bodies, councils felt empowered to encumber music halls with moral as well as legal conditions. This provided a framework within which the supposed excesses of the halls, particularly prostitution, could be dealt with without requiring the total suppression of the halls. These more effective, piecemeal controls, without alienating proprietors whose audiences were increasingly lower middle class, greatly strengthened the position of the hitherto ineffectual social reformers. The die-hards, typified by F.N. Charrington, and implacably opposed to music halls in any form were ousted by a new breed which was more willing to negotiate its demands in the forum of the local council licensing committee.

The Spatial Distribution of Department of Defense Procurement: A Disaggregated Perspective by Jeffrey R. Crump, Department of Geography, San Diego State University, San Diego, CA. 92182.

The regional development implications of federal outlays typically vary according to the type of expenditure involved. In order to obtain a better grasp of the developmental implications of federal budgetary allocations, federal expenditures need to be analyzed at a functionally disaggregated level. The goal of this paper is to find the spatial distribution of Department of Defense (DOD) expenditures for services and manufactured goods at a detailed (functionally) level. The purpose is to discover what types of DOD services procurement occur in concert with the various categories of military hard goods outlays. Preliminary analysis indicates that DOD purchases of professional services tend to be concentrated in the same states that specialize in the production of high-technology military equipment. On the other hand, business and equipment repair and modification services are generally associated with the locations of military bases. There appears to be two major bundles of defense-related activity. One consists of high-tech manufacturing and professional services and another that includes business and equipment-related services along with military base operations.

MIGRANCY, HOUSING AND INDUSTRIAL RELATIONS IN THE SOUTH AFRICAN MINING INDUSTRY by Jonathan Crush, Department of Geography, Queen's University, Kingston, Ontario. K7L 3N6

This paper presents a preliminary appraisal of a collaborative research project on the restructuring of migrant labor systems in contemporary Southern Africa. In 1986, the National Union of Mineworkers declared war on the migrant labor system and called for the dismantling of the compounds. To pre-empt further protest, the mining houses unveiled a new housing strategy which would see over 20 per cent of the mine workforce stabilized by the year 2000. The background, rationale and substance of this strategy are discussed. Housing delivery is placed in the context of changing forms of labor organisation and control in the gold mining industry. The paper concludes with an assessment of the constraints on the implementation of the strategy including the political economy of gold mining, the fiscal crisis of the South African state and the response of black miners to non-consultative housing delivery.

A SECOND HOME: PREVIOUS PLACE EXPERIENCE AND DESTINATION SELECTION IN RETIREMENT DECISION MAKING. by Lee J. Cuba, Department of Sociology, Wellesley College, Wellesley, MA 02181

Theoretical models of retirement decisionmaking often distinguish between the decision to move and the selection of a retirement destination. Interviews with a group of regional retirement migrants, however, indicate that these two processes are neither necessarily distinct nor sequential stages of migration decisionmaking. This paper argues that variation in previous experience with the migration destination (e.g., seasonal residence, regular or occasional visiting) affects the degree to which the decision to move is made apart from the decision where to move: the more extensive the previous contact with the destination, the more highly conjoined are the decision to move and the decision where to move. These findings suggest that a comparative evaluation of generic place characteristics of destinations (e.g., climate, recreational amenities) is differentially utilized by retirement migrants. Data for this paper come from surveys administered to two random samples of migrants aged 55 and over (N=163) and indepth interviews with 83 persons of the same age residing in two Cape Cod, Massachusetts, communities. (This research was supported by Grant No. 50R29-AG05591 from the National Institute on Aging.)

MOUNTAIN MYTHS AND MOUNTAIN MAGIC: A MIX OF TRADITIONAL AND NEW AGE–MT. SHASTA, CALIFORNIA by Claude W. Curran, Department of Geography, Southern Oregon State College, Ashland OR, 97520.

Traditional Indian legends and myths created by early explorers and fur trappers have focused on California's Mt. Shasta, a stratovolcano in the southern Cascade Range.

During the last fifty years a series of new religious organizations, cults and "New Age" believers focus on the mysticism and magic of this massive mountain.

Mt. Shasta was the refuge for Lemurians when the ancient continent of MU sank in the Pacific. A secret colony was established within the mountain. In the 1930's Guy V. Ballard discovered St. Germain on the slopes of the mountain which gave rise to the St. Germain Foundation and the "I Am" religion which is centered near Dunsmuir, California.

Other groups included Sree Sree Provoo, The Blue Flammers and Sanat Sananda Kumara. Most of these societies developed in the decades of the period 1940–1970. In the mid-70's Elizabeth Clare Prophet attracted nearly 3,000 worshippers to achieve spiritual freedom through emulation of the ascended masters.

Other groups focusing interest on Mt. Shasta include the Lizard People, Clock People, the Secret Commonwealth, Mystic Masters, MAFU, and various UFO "happenings." The culmination of recent activity focusing on "the mountain was the Harmonic Convergence in which about 4,000 people gathered at Mt. Shasta City for the coming together of people of every walk of life to experience and celebrate the harmony of all life on planet earth by creating "a complete field of trust by surrendering themselves to the planet and to the higher galactic intelligences which guide and monitor the planet."

THE GRAVITY MODEL AS A TRANSFER FUNCTION by L. Curry, University of Toronto.

A maximum entropy derivation of a negative exponential distribution of commuter flows is suspect because (1) it requires an unbounded uniform origin/destination map (2) it assumes only the first moment of distances is known (3) it denies any aversion to travel and that some configurations of trips are more likely than others. The derivation of a logarithmic decline with distance from potential arguments is more insightful because it takes account of competition for and in the selection of jobs. But this particular function also requires an unbounded uniform distribution of origins and destinations.

It may be shown that the transfer function is also a potential operator with its virtues. Being referenced to the areal differentiation domain, it matches origins and destinations via their scale components indicating how balances are achieved at decreasing degrees of localness, rather than via distances moved. General operators are not necessary so that homogeneity need not be assumed.

POSTMODERNISM AND THE SEARCH FOR GEOGRAPHIES BEYOND TIME by Michael R. Curry, University of California at Los Angeles, Los Angeles, CA 90024

Recent years have seen attempts to construct "postmodern" geographies which will avoid the problems of past geographies while allowing a better understanding of the current world. These geographies reject much of traditional social science. They propose new attitudes toward language, and are staunchly relativistic. And they attempt to reflect a more self-conscious attitude toward historical epochs.

Of special note to those interested in the history of geographic ideas is that in claiming new solutions they seem to suggest that the traditional tools of the historian of ideas or science may be inadequate to the task of understanding their own genesis.

This paper considers this issue. It concludes that far from being a new response to new issues, much of postmodernism involves the introduction of older, pre-Enlightenment traditions into geographic work. Those traditions, often ignored in geography, have in this century been at the forefront of much work in other fields.

At the same time, postmodern geographers treat epoch with the same naive realism that infected earlier studies of region. Hence, they seem to express an intellectual debt neither to those non-geographers—including historians of ideas and sociologists of science—who have worked outside of the Enlightenment tradition nor to those geographers who have sought to understand the ontology of regions. For that reason, postmodern geographers seem no less than the modernists whose work they reject to see themselves as able to stand beyond time. Thus, the more interesting question is why geographers have persisted in this belief.

THE OTHER SIDE OF TOKYO: AN INTRODUCTION TO ARAKAWA WARD by Roman Cybriwsky, Temple University Japan, Tokyo 161 Japan.

Arakawa Ward is located in the northern part of Tokyo, in a flat riverbend area that is dominated by industry, low-rent apartments and decrepit old houses, and various noxious facilities such as sewage disposal and a large crematorium. It is a sharp contrast with the CBD only five kilometers away and with fashionable districts on the west side and elsewhere. It is not particularly well known, even within Tokyo, and presents on inspection a totally different view of the city than is its general reputation.

This paper is an introduction to this district and to some of the neighborhoods within it. Emphasis is on Minami Senju, the poorest subarea in Arakawa. Much of it is a large skid row neighborhood that is home to many of Tokyo's unemployed and to day laborers and other marginal workers. Also, it is identified with traditional outcaste groups in Japanese society. The objective of the paper is to understand the distinctive nature of poverty in this particular context, and to explain why and how this area became such a low-status district. Considerable attention is given to local history. We will see that Arakawa's early role as a place for executions of criminals and for "cremating temples" has created a negative image that endures to the present and that relegates specific sites, including much of Minami Senju, to the bottom of society. However, the excessive cost of land in Tokyo and the lack of space for urban expansion is beginning to change this and to bring new developments like those in the rest of the city.

ETHNOGEOGRAPHY OF THE MANDAN AND HIDATSA: 1738-1889

By Kenneth C. Dagel, University of North Dakota, Grand Forks, ND 58201.

Contributions of Native Americans to North American toponyms are significant but relatively unrecognized. North Dakota place-names reflect a rich aboriginal heritage, but much Native American toponymy has been modified or forgotten since 1738. Consequently, there is a low public awareness of past and present distributions of indigenous place-names and, more importantly, what the named sites meant to the native people of North Dakota.

Toponyms of the Mandan and Hidatsa, as obtained from historical journals, secondary sources, and informants, were classified using a standard toponym typology. Predominant among recorded names were those applied for pragmatic reasons and those based upon environmental perception. Actual locations identified by environmentally perceived native names were and are culture-intrinsic, places so significant that their loss would seriously weaken the cultural fabric of the community. Results indicate that 84 percent of names identified as Mandan, and 63 percent of names identified as Hidatsa, were environmentally perceived. Additionally, 87 percent of Mandan, and 81 percent of Hidatsa place-names were culture-intrinsic.

Two conclusions implicit in this research are: 1) the Mandan and Hidatsa were very cognizant of their immediate environment, naming sites based upon an intimate knowledge of their surroundings, which suggests that they considered themselves more a component of that environment rather than a controller of it, and 2) the specific sites, if they are relatively unaltered and still being utilized as originally intended, will aid in determining the extent and tenacity of Mandan and Hidatsa cultural distinctiveness.

COUNTY-BASED APPROACHES TO CATEGORIZING SETTLEMENTS AND THEIR APPLICATION TO U.S. POPULATION RESEARCH

by Donald C. Dahmann, Population Division, U.S. Bureau of the Census, Washington, DC 20233

The county is considered as a unit of analysis to represent settlement areas in the United States. The research of geographers and others in categorizing nucleated settlement areas (cities and metropolitan areas) and dispersed settlement areas (rural and nonmetropolitan areas) is reviewed. Categorizations consider these two forms of settlement independently and in unified manners.

It is concluded that: (1) counties serve as appropriate units of observation and analysis to address a variety of population research questions when wishing to include the settlement context, and particularly so at the national scale; and (2) county-based categorizations of settlement areas conform with popular-culture notions and theory-derived understanding. These categorizations are also readily integrated into statistical analyses and are geographically stable over time. The consequences of this for including settlements as a contextual setting in population research are discussed.

THE ROLE OF HOLOCENE EOLIAN SEDIMENTS IN SOIL DEVELOPMENT, WIND RIVER MOUNTAINS, WYOMING

by Dennis E. Dahms, Geography, University of Kansas, Lawrence, Kansas 66045-2121.

Heavy mineral analyses of soil sediments indicate that soils on catenas of Pinedale and Temple Lake moraines of the Wind River Mountains contain eolian sediments from the nearby Green River Basin. Soils from three physiographic regions were analyzed for volcanic mineral content, particle size distribution, and depth of fine sediment over till. The results are consistent with existing models for eolian sedimentation.

The amount of silt-sized volcanic minerals in moraine sediments decreases with altitude and distance into the mountains. Concentrations of volcanic minerals are highest on the southern-most piedmont moraines (closest to the Green River Basin) and decrease northward. The lowest concentrations are located on the northern-most and highest alpine moraines.

The mean particle size of whole soils (expressed as weighted phi mean) decreases with increasing altitude and vegetation cover. Soils with the finest weighted means are those of the erosion surface and alpine catenas, while the coarsest are found on the piedmont moraines. Likewise, the depth of fine sediment over till (expressed as A-B horizon depth) decreases with altitude.

The mineralogical and sedimentological data show that net silt plus clay deposition is occurring at all catena positions, and indicate that Holocene eolian sedimentation is an important and continuing factor in soil genesis of the Wind River Mountains. Furthermore, these sediments have been traced to their sources among eroded Eocene lake deposits of the Green River Basin.

"RETHINKING EUROPEAN GEOPOLITICS: THE DISCOURSES OF DEALIGNMENT"

by Simon Dalby.

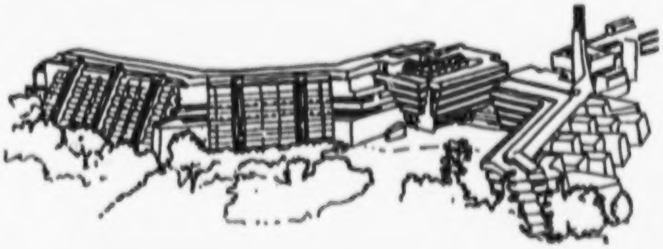
Abstract of a paper for presentation at the Annual meeting of the Association of American Geographers. Toronto, April 1990.

In the wake of glasnost, perestroika, and renewed discussions of the decline of American global influence, the future of NATO and post-war global 'bloc' political arrangements are once again in question. The fading credibility of the 'Soviet threat' to Europe and the recurrent doubts concerning the need for, or the efficacy of, US security 'guarantees' form the backdrop for contemporary debates on global political reorganisation. In particular they set the scene for a series of contemporary arguments advocating European 'dealignment' from the superpower blocs. These arguments involve a rejection of the current geopolitical order with its superpower domination of global political arrangements. Distancing local and national policies from superpower control requires rethinking security strategies, and involves exploring the possibilities of alternative defense and common security arrangements. These political arguments simultaneously involve a reduction in geopolitical polarisation and a reassertion of local sovereignty. Because these arguments challenge the existing geopolitical order they offer important insights into the political geography's concerns with the politics of space.

RECENT CHANGES IN TREE DISTRIBUTION NEAR BUTTE, MONTANA

by Lara M. Dando and Katherine J. Hansen-Bristow, Department of Earth Sciences, Montana State University, Bozeman, Montana 59717.

The natural barriers controlling the distribution of the forest-grassland ecotone near Butte, Montana, have apparently been altered in the recent past. Rocky Mountain juniper and Douglas-fir have begun to dominate in parts of the lower forest ecotone previously occupied solely or predominately by grasses. By examination of tree ages within the study area, the relationships between natural and human-induced changes and forest distribution changes have been analyzed. Probable influencing factors include high numbers of domestic livestock reducing the native grasses and disturbing the soil, climatic changes, fire suppression, and air-borne pollutants from a copper smelter upwind. The geography and geology of the area have the potential to control the pattern of growth and change of the distribution of trees.



RUSSIAN-SOVIET URBAN FAMINES: IMPLICATIONS FOR A FUTURE WORLD OF MEGA-CITIES

by William A. Dando and James D. Schlichting, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809.

Urban famine is a protracted severe shortage of food supply of sufficient duration to cause widespread disease and death from starvation within the confines of a major population center. Between the years 971 and 1943, over fifty urban famines were recorded which indiscriminately and mercilessly claimed the lives of millions of urban dwellers in ancient Rus and modern Soviet Union. These phenomena are analyzed for insights into food problems which will confront and may subsequently afflict major urban areas, primarily in the third world, during the early twenty-first century. Historical analyses of Russian and Soviet alimentary problems are possible by examining city chronicles, government reports, popular literature of the time, newspaper articles, and writings of individuals who survived to record the horrors of pervasive malnutrition, starvation, and disease. Classified by region and time period, three distinct and significant types of famine affecting urban centers emerged: Novgorod (971-1550), Moscow (1551-1770), and Leningrad (1941-1943). Insights gained into the causes of urban famine illuminate the full complexity of the dynamic relationships between food and politics that has not been recognized in current world urban hunger and famine action programs. While future urban famines are not inevitable, lessons learned from Russian and Soviet urban famines demonstrate that they will undoubtably be human-made.

THE AFFECTS OF TRAINING FIELD SIZE ON IMAGE CLASSIFICATION ACCURACY, by Richard C. Daniels, Miami University, Oxford, Ohio 45056.

Classification of remotely sensed data for land cover mapping is usually conducted using supervised classification methods. The use of supervised classifiers hinges on the ability of the algorithm being used to recognize the spectral patterns of the ground cover classes being sought. Selection of representative training samples, used in developing these spectral patterns, is more important in obtaining accurate classifications than the algorithm used. The dominant method currently used in the sample collection process involves the use of a template, the training field, for training sample extraction.

This study examines the extent to which training fields of various sizes affect the training statistics, and accuracies of the Minimum Distance to Mean and Maximum Likelihood Classifiers. Based on comparison of classified (TM) images, prediction data, and the results of ANOVA, Honestly Significantly Difference, and Omega squared tests the following conclusions were drawn: 1) classification accuracy decreases as training field size increases; 2) variation between training statistics increases as training field size increases; and 3) the Minimum Distance to Mean classifier is not affected to as great an extent by these variations as the Maximum Likelihood Classifier.

TRACKING AMERICA'S LEARNED ELITE: COLLEGE ALUMNI CATALOGUES AS A SOURCE OF NINETEENTH CENTURY MIGRATION INFORMATION by James W. Darlington, Brandon University, Brandon, Manitoba R7A 6A9.

College alumni records offer a rich data resource for the historical migration researcher concerned with a select but important segment of nineteenth century North American society. This paper briefly surveys the information contained in the published alumni catalogues of a number of eastern, primarily New England, colleges. Such catalogues normally list, by year of graduation, the graduates' place of birth and place of death. Many also provide the date of birth and principal occupation(s) of each alumnus. Some volumes, including those of Dartmouth, Middlebury, and Williams, contain a more extended capsule biography of most graduates. These biographies provide information pertaining to the size and composition of the individual's family and a complete or near complete listing of each man's post-collegiate place(s) of residence. This combination of information makes it possible to identify several migration differentials among the graduate population, and also to chart in considerable detail the migratory behavior of a sizeable segment of each school's alumni over an extended period.

TRENDS IN U.S FOREIGN DIRECT INVESTMENT IN PRODUCER SERVICES by Fiona M. Davidson, Department of Geography, University of Nebraska-Lincoln, Lincoln NE 68588-0135.

In the past several decades the United States economy has become increasingly dependent upon service, rather than manufacturing, activities. Included in this service sector are the producer services (FIRE, business services and engineering/architectural services). This sector has had high growth rates in terms of employment in the past two decades and one reflection of the growth in these industries has been an increase in U.S. foreign direct investment in this sector.

The purpose of this study is to examine the growth in foreign direct investment in producer services and to determine both the spatial distribution of the investment and the changes in volume and distribution that have occurred since 1977.

A second focus of the study, is the nature of producer service investment abroad. It has been suggested that the characteristics of producer service foreign direct investment are different from that of manufacturing, leading to different impacts on the host economy.

Initial results suggest that while producer service FDI is concentrated in the Developed Market Economies, the fastest growth is occurring in Asia and the Middle East. In addition producer service and manufacturing FDI appear to have quite different levels of employee compensation and investment per employee.

MORPHODYNAMICS AND SEDIMENTOLOGY OF LONGSHORE SANDWAVES by Robin G.D. Davidson-Arnott, A. Van Heyningen and D. Armstrong, University of Guelph, Guelph, Ontario N1G 2W1

Longshore sandwaves found on Long Point, Lake Erie are local beach protuberances with alongshore lengths of 500-3000 m and maximum widths at the downdrift end of 50-100 m. They migrate alongshore in the direction of net drift at rates of 150-300 m yr^{-1}, and have a lifespan of 10 years or more. Alongshore migration takes place in two ways: (1) by incremental downdrift extension; and (2) by welding and emergence of a nearshore bar at the downdrift end of a sandwave, resulting in a downdrift "jump" of 200-500 m. These two processes produce distinct process/responses in the beach and inner nearshore and a different set of internal sedimentary structures.

THE USE OF GEOCHEMICAL SIGNATURES IN STRATIGRAPHIC INVESTIGATIONS OF ARCHEOLOGICAL SITES IN SOUTHERN HOKKAIDO. JAPAN by A.M. Davis. Department of Geography. University of Toronto. Toronto. Ontario M5S 1A1. R.G.V. Hancock. SLOWPOKE Facility and Department of Chemical Engineering and Applied Chemistry. University of Toronto. and C.A. Stimmell. Department of Anthropology. University of Toronto.

Conventional soil analysis at archeological sites is generally a mixture of subjective field designations and relatively simple quantitative laboratory analysis of standard physical and chemical characteristics. These techniques may be inadequate for sites with complex stratigraphy and unusual soil conditions. In such situations. the identification of geochemical signatures may aid interpretation. Instrumental neutron activation analysis (INAA) provides precise and reliable elemental data from small samples rapidly. Because of their stability. the rare earth elements (REE) are more suitable than the macroelements for diagnostic purposes. The technique is now used routinely for provenance studies on artifacts. but has not been applied to unravelling site stratigraphies.

The technique is applied here to sites in southern Hokkaido. Japan. where stratigraphies are dominated by as many as six paleosols formed in pyroclastic materials. INAA of the REE permits the establishment of regional geochemical signatures for these soils. provides a chronology which is independent of archaeology and thus acts as a check on provenance. and allows insight into the rate of geomorphic and pedogenic processes at these sites. Differences in the chemistry of the andepts reflect regional petrographic provinces determined by plate tectonics.

COLONIAL WATER CONTROL SYSTEMS IN THE EASTERN BAJIO OF MEXICO by Clint E. Davis, Department of Geography, The University of Texas at Austin, Austin, Texas 78712

Changing ecologies and environments resulting from the introduction of new plant and animal species had a profound effect on community development and the structure of agronomic enterprises in 16th century Mexico. The sequence of human adaptation whereby Spanish culture reacted to and integrated with indigenous cultures and the environment in the eastern Bajio of north-central Mexico are crucial factors in the development of entirely new land use patterns and water control systems. These new patterns and systems involved canals and embanked fields to form the historical trajectory of land use and water rights for communities in the fertile lands of the region. The origins, diffusion, and development of these systems, information about which is conspicuously lacking in archival records, are in part reconstructable by two approaches:
(1) intensive and extensive field mapping and survey of extant water control systems and colonial communities and (2) collection of oral histories from communities involved in colonial settlement. The use of canal irrigation and embanked fields in the eastern Bajio lead to conflicts over water and land rights and to the consolidation and fragmentation of settlement. Communities deal with practical tasks of construction and maintenance of water control systems and the allocation of water, so that social conflict and ecological deterioration are resolved. Embanked fields and to a lesser degree canal irrigation directly influence the short and long term stability of all communities in the region from the 16th through the early 20th century.

HOMICIDES IN THE CAPITAL CITY: A CASE STUDY OF WASHINGTON, D.C. by DeWitt Davis, Jr., University of the District of Columbia, Washington, D.C. 20008.

The purpose of this paper is to determine where the homicides more frequently occur within the central city of Washington D.C. and to determine if spatial relocation and expansion diffusion are occurring more during the last few years. This may help to discover if the city is safe or dangerous. Many of these homicides should be classified as street homicides because many of them transpire outside the dwellings. This certainly concerns the residents of the city as well as visitors who are pedestrians. It is believed that many of the homicides in recent years are drug related, especially the street homicides.

The research time period ranges from 1980 to 1989, and the study concentrates on the homicides that have taken place at the census tract level during several year periods. A comparative analysis is conducted to ascertain the annual increases and decreases in the census tracts. The major conclusion is that homicides are consistently occurring in the same census tracts each year with some exceptions. Spatial relocation and expansion diffusion are not particularly widespread, and there are clusters of census tracts or neighborhoods that are homicide prone. As a result, it is suggested that Washington, D.C.,with some exceptions, is relatively safe and free from street homicides.

SPATIAL ISSUES IN THE COMPETITION FOR ECONOMIC DEVELOPMENT IN METROPOLITAN AREAS by James A. Davis, Department of Geography, Arizona State University, Tempe Arizona 85287.

Traditionally local governments have provided the infrastructure and service delivery demanded by new development. However, the tax payer revolt of the 1970s and 1980s and the reduction in funds available from the federal government have forced many communities to search for alternative methods of financing. Frequently, this compels neighboring communities within one metropolitan area to become competitors in the fight for scarce economic dollars.

A recent down turn in the local economy of the Phoenix, Arizona has forced cities in the metropolitan area to identify new sources of income to provide infrastructure and services, while at the same time trying to protect their economic base. This study is an analysis of how competition between local governments in the Phoenix, Arizona metropolitan area has affected land use development within the region.

HIGHWAY AND STREET TRANSPORTATION FACILITIES ANALYSIS OF WARREN COUNTY, KENTUCKY by James L. Davis, Western Kentucky University, Bowling Green, Kentucky 42101.

This study analyzes the highway and street transportation facilities available in Bowling Green and Warren County, Kentucky. The author evaluates the highway network by examining street patterns; parking facilities and patterns; traffic controls; accident patterns; and by making a capacity analysis of the system. The author also makes assessments of vehicle ownership patterns, public transportation, and the trucking system.

Among the conclusions are the following: highway and street travel by automobiles and trucks is the most significant form of transportation in Bowling Green and Warren County; I65 and the Green River Parkway facilitate high mobility for both intrastate and interstate travel, while the US 31W, US 68, and US 231 arterials serve as regional and local linkages and provide access to the major traffic generators of the city and county; considerable parking problems exist on the Western Kentucky University campus and the city streets surrounding the campus; congestion problems or overloaded facilities currently exist in the city and county on US 231, US 31W, the 31W Bypass, US 68-KY 80, and parts of Campbell Lane, KY 234, and KY 185; traffic flow in Bowling Green would be much improved if the city could implement a fully computer-actuated traffic signal networking system; the number of registered vehicles in the city and county rose by more than 300% between 1950 and 1988, a significantly higher rate than in either the state or nation; and twenty-nine trucking companies provide service to the area, with fourteen local terminals being currently maintained.

THE IMPACT OF SHORT-TERM WEATHER EVENTS UPON LONG-TERM VISIBILITY CHANGES by Robert E. Davis, Department of Environmental Sciences, University of Virginia, Charlottesville, Virginia 22903, and David R. Legates, Department of Geography, University of Oklahoma, Norman, Oklahoma 73019-0535.

Long-term visibility trends are commonly analyzed to infer changes in air quality. Because of increased anthropogenic activity and subsequent air policy legislation providing for the protection of pristine areas, proper studies of the local and regional variations in visibility are required. However, air quality scientists have often experienced difficulty in determining the impact of short-term weather events on long-term visibility changes, as the frequency of various air mass types, particularly stable or humid air masses, has a significant impact upon air quality.

To alleviate this problem, a synoptic climatological approach is used to assess temporal visibility variations. Using surface weather data, each day is classified into a synoptic category with other similar days. The procedure involves performing principal components analysis on 24 weather elements and clustering the consequent component scores. The resulting groups contain days with fairly homogeneous weather characteristics. Visibility changes are analyzed within synoptic category, thus standardizing for the influence of weather variations.

Analysis for several cities in the mideastern United States suggests that this approach can be quite useful in providing a climatological baseline against which changes in air quality can be assessed.

LOW-COST COMPUTER MAPPING AND IMAGERY ANALYSIS OF SMALL, REMOTE REGIONS by Cyrus B. Dawsey, Auburn University, Auburn, Alabama 36849.

The limited access to digitized basemaps of small areas in foreign countries limits the application of computer cartography. Basemaps are usually not commercially available and are expensive to produce. This report demonstrates a technique that allows direct digitizing of basemaps using an inexpensive computer and no additional peripherals. Outlines of enumeration areas (municipios in Brazil) are used for chorapleth mapping, and the results are compared to digitized remote imagery of the area.

SHARING THE NORTH AMERICAN CLIMATE by D. K. Dawson, Canadian Climate Centre, Atmospheric Environment Service, Downsview, Ontario M3H 5T4.

The purpose of this paper is to review the scientific background of climate change, to examine, from a North American perspective, its potential socio-economic consequences and to propose a need for and a move towards integrated ecosystem impact assessments. In the past few years there has been a growing recognition that human activities are leading to major changes in the atmosphere. One of these is expected to result in a global temperature rise over the next few decades which is unprecedented in the history of mankind. The potential impacts of climate warming are likely to include many adverse consequences; for some areas of the globe, however, there may be relative advantages.

Canada and the U.S. have each developed advanced climate impact programs, to assess the potential socio-economic implications of climate change. While these have clearly indicated some of the threats, most of the individual studies have been focussed on sector-specific impacts. We have now reached a point where the next generation studies should move toward integrated ecosystem impact assessments; the Central Plains and Great Lakes regions of North America are proposed for initial consideration.

JOINING TRADE ASSOCIATIONS: BRITISH AND CANADIAN EXPERIENCES COMPARED by J.Dawson, Dept. of Geography, McMaster University, Hamilton, Ontario. L8S 4K1.

Trade blocs are becoming very significant in the world economy as countries increasingly find it difficult to maintain economic and political power on an individual basis. Britain and Canada are two countries who have recently chosen to join one of these blocs: Britain joining the European Economic Community in 1973 and Canada joining the North American Free Trade Area in 1988. Although the two countries took similar action, their experiences were in many ways quite different, which makes comparing the two cases particularly interesting.

First, the historical evidence for both Britain and Canada is examined. The way in which each has developed its past and present international trade relations has considerable bearing upon how it perceives itself in the world and therefore the role it might be prepared to play in a trade association. Second, the methodological evidence is considered. The type of economic models, and the philosophical framework behind them, which a country's analysts use to determine what the likely impacts from trade bloc accession will be, are particularly indicative of that country's national priorities, and often show what its government hopes to gain from any agreement which has been made.

From the comparison of the two countries' experiences, emerges a unifying theme; namely that both their historical trade relations and their methodological approaches can be explained by reference to their, and their analysts', situation in time and space. This finding therefore has encouraging implications for the possibility of establishing a uniquely geographical approach to the study of such complex phenomena as international trade associations.

MILITARY RETIREMENT MIGRATION IN THE U.S. by Frederick A. Day and Charles L. Jackson, Department of Geography and Planning, Southwest Texas State University, San Marcos, Texas 78666.

The retirement patterns of former U.S. military personnel appears to be markedly affecting the spatial distribution of the American population. Maps of retirement locations show the tendency to retire in the South, and in particular, the states of Texas, California, Washington and the southeast coast. Regression analyses of the U.S. and Texas locations of military retirees show several variables affecting the migration process, in particular, climate and distance to a nearby base.

TRANSNATIONAL WATER QUALITY MANAGEMENT IN THE STRAIT OF GEORGIA, BRITISH COLUMBIA, AND PUGET SOUND, WASHINGTON STATE by Sandra P. Tippett and J.C. Day, Simon Fraser University, Burnaby, British Columbia V5A 1S6.

The waters of Puget Sound are essential for many human activities--recreation, various economic endeavors, waste disposal. Pressures on water quality arise from increased industrialization, agricultural practices, and growing population. For example, an accumulation of toxins in the food chain has produced lesions in bottom-dwelling fish near industrial and urban areas. Deteriorating water quality causes conflicts which will intensify as industrial, residential, and recreational demands grow. These conflicts occur across municipal, provincial, and international boundaries, necessitating interjurisdictional remedies.

Heightened concern about water quality has led to public pressure, resulting in legislation in Washington State and British Columbia. In Washington, the Puget Sound Water Quality Authority (PSWQA) was created to develop and implement the Puget Sound Water Quality Plan; in British Columbia, the Fraser River Management Program was developed. Both were implemented in 1985 with five-year life spans, but the PSWQA has a budget of $119 million (U.S.) compared with $1 million (Canadian) for British Columbia. Washington also has a special fund to improve public awareness and involvement.

Antipollution legislation exists in both countries, but monitoring and enforcement is comparatively limited in British Columbia due to inadequate funding, personnel, and government interest.

KARST VALLEY SYSTEMS IN THE NAPIER RANGE, WESTERN AUSTRALIA by Michael Day, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53201.

One general principle of karst development is that through time dissolution underground increases the capacity of subterranean drainage systems. As more runoff is directed underground, surface drainage diminishes and valley networks may be abandoned.

On the Devonian reef limestones of the Napier Range the semi-arid karst landscape is characterized by valley systems which carry runoff generated by wet season storms. Because wet season rainfall is intense enough to produce surface runoff, valleys are maintained even though much of the water eventually drains underground.

Valley forms, including canyons, amphitheatres and major embayments, are influenced strongly by the structure of the various reef units. Some valleys are isolated from the surrounding plain by cliff-edge ramparts behind which stormwater is ponded before draining underground to seepages, springs and caves. Valley floors are coated by redeposited calcite, and stream courses are marked by cobbles which in the dry season are coated by desiccated algae. Some valley courses contain tufa dams. Some alluvial deposits are several meters thick, and alluvial fans are developed, where floodwaters emerge onto the surrounding plain.

URBAN RANK-SIZE RELATIONSHIPS IN BANGLADESH by Jashinta D' Costa, Department of Geography, Michigan State University, East Lansing, MI 48824, U.S.A.

The hierarchical structure of city-size distribution in Bangladesh shows the predominant role of one city. The centralization of manufacturing and other important services i.e., information services, international air services, and the administrative functions causes large scale rural-urban migration making the primate city too large, inefficient, and crowded.

This study attempts to analyse the trend of the city-size distribution over the past 80 years since 1901 to 1981. The trend is statistically analysed using the linear regression technique. It shows a steady progression of urban rank-size relationships toward primacy with two marked shifts caused by major political changes in 1947 and 1971.

SUSTAINABLE DEVELOPMENT AND TOURISM: SOME EXAMPLES FROM THAILAND by Philip Dearden, Department of Geography, University of Victoria, Victoria, B.C. V8W 2Y2.

Sustainable development has been accepted as a desirable goal by many governments following the release of the report of the World Commission on Environment and Development, Our Common Future. Although the report identified many problems relating to environment and development, and indicated some general directions in which change should occur, much remains to be done in making the observations operational on a systematic and regional basis. This paper examines the challenges presented by the sustainable development of tourism, particularly that in lesser developed countries, using examples from Thailand.

Tourism has often been used by governments in both developed and lesser developed countries as a means to promote economic development. In Thailand aggressive tourism promotion has seen tourism surpass rice as the main earner of foreign currency during the 1980's. This growth has not been without costs, especially those of an environmental and cultural nature. This paper uses several examples from both coastal and hilltribe tourism to illustrate a range of problems at various scales of development.

The Royal Thai Government is becoming increasingly aware of these problems, but, as yet, has done little to address them. Despite similar situations having occurred in many different parts of the world it seems that tourism may have quite particular challenges in coming to terms with the mechanics of a sustainable development philosophy, both in a generic sense and also in Thailand.

OLIGOPOLY, THE PROFIT CYCLE, AND RESORT DEVELOPMENT IN THE BAHAMAS,

Keith G. Debbage, University of North Carolina-Greensboro, NC 27412

Markusen's concept of 'profit cycle', and the influence of oligopoly, is applied to Butler's notion of the resort cycle. Butler's emphasis on the internal dynamics of the resort area underemphasizes the broader economic environment. The stagnation and decline associated with the latter stages of the resort cycle can be explained by industrial organization and the oligopolistic position of the major suppliers. The study area of Paradise Island (Bahamas) appears to be a clear example of how the corporate strategies of a major supplier can dramatically influence the resort cycle process. Resorts subjected to long-term oligopoly can experience eventual declines in the number of visitors because of an emphasis on market share and competitive stability, at the expense of post-Fordist innovation and flexible production.

CONSTRAINTS ON SPATIAL SCALE TRANSFERENCE IN PROCESS GEOMORPHOLOGY

by Dirk H. de Boer, Department of Geography, University of Alberta, Edmonton, Alberta, Canada T6G 2H4.

Geomorphic systems possess a hierarchical nature. Every geomorphic system consists of smaller, lower-level systems, and is at the same time part of larger, higher-level systems. Insight into the problems of spatial scale transference aids in focussing on the dominant hierarchical levels controlling behaviour of the geomorphic system of interest.

The effect of spatial scale on the rainfall-runoff relationship and sediment and solute dynamics was investigated in a series of semi-arid, ephemeral, badland drainage basins. The timescale of interest was that pertaining to basin response to a single rainstorm. Results from the field study indicate that spatial scale transference between basins of differing scales is restricted by morphological and functional constraints. Morphological constraints are caused by morphological elements existing in large-scale systems while being non-existent at smaller scales. An example of such a morphological element is the system of deep tunnels, absent in microscale basins but strongly affecting sediment dynamics at the mesoscale. Functional constraints arise from the characteristics of the matter and energy flows in the systems of interest. For instance, sediment dynamics in the field area are controlled by the ratio of the response times of the deep tunnel systems to that of the basin. Because basin response time increases with basin scale, certain aspects of sediment dynamics are scale dependent. The boundaries imposed upon spatial scale transference by both morphological and functional constraints are fuzzy rather than sharp in character.

LIGHT AT THE END OF THE TUNNEL? EUROTUNNEL AND 1992

by K. De Bres, Valparaiso University Department of Geography, Valparaiso, Indiana 46383.

The Eurotunnel, the first permanent link between the United Kingdom and Europe, was originally scheduled to open in May, 1993. This paper will discuss the technical challenges, the strategic context and the political and economic issues of the Tunnel. Particular attention will be paid to land use issues in Kent and employment problems/possibilities in England and France, as well as the current technical problems which the builders of the Tunnel face. Propaganda techniques used to finance the Tunnel and to increase public support for the project will also be discussed. Will the road and rail system in southeast England , especially in Kent, become saturated with Channel Tunnel users? How will Eurotunnel, British Rail and the British government meet these challenges? Why have the French been able to manage the French side of the Eurotunnel development with far fewer problems?

CELLULAR AUTOMATA MODELS OF REMOTE SENSING IMAGERY

by Lee DeCola, U.S. Geological Survey, 521 National Center, Reston VA 22092.

Spatial pattern as perceived by digital sensors may be viewed as the outcome of multiscale cellular processes. Urbanization, for example, may be modeled as cellular aggregation, agricultural development as diffusion, and hydrology as a nonisotropic random walk. This paper reviews such processes in the wider context of cellular models, to demonstrate how such patterns can be described using multifractal concepts of autocorrelation. A central concern is to explicate the role of scale, as well as temporal priority, in pattern. A few interesting patterns based on a fine-grained, few-state cellular model were aggregated into successively coarser, many-state images. Results from these simulations are compared to satellite imagery, both raw and classified. The practical goal of these exercises is to relate existing theory of land cover processes with models and to address the problem of the integration of multisensor imagery. A technical objective is to improve geographic analysis systems by demonstrating how they can provide better analytical output (tests of hypotheses) and improved visualizations of data. A particular problem area to be addressed is the simultaneous monitoring of land cover change in large regions, such as the West African rain forest.

LAND USE IN THE CAROLINA BAYS

by Thomas E. Ross, Pembroke State University, Pembroke, North Carolina 28372, and Jennifer L. DeHart, Appalachian State University, Boone, North Carolina 28608

First recognized on the Atlantic Coastal Plain landscape in the 1840s, the Carolina Bays have been a topic of numerous studies since 1895. The majority of the research has, until recently, centered on the quest for an explanation of the origin of these shallow, elliptical depressions which have a northwest-southeast orientation of their long axis. Despite numerous proposed theories of origin, the process of origin continues to be elusive.

This presentation examines present-day land use in Carolina Bays and illustrates the pressure being exerted upon the bays by human activities. The data for the research are taken from field research and photographs.

Many bays are characterized by low, moist areas surrounded by an elevated sand rim. Without extensive drainage networks, these wetland bays cannot be converted to agricultural or other human uses. The rims, however, can and have been used since the earliest human occupation of the Coastal Plain region. During the expansion of agricultural lands in the 1970s, many bays were drained and cultivated. Areas once home to diverse wildlife and rare plants have been converted into large fields of soybeans, corn, wheat, and other agricultural products. An expanding population in the region is also making demands on bay land for numerous suburban and urban uses. Like most natural environments, bays, once drained, do not return to their natural state, and vital habitat is lost. It is apparent from this research that many Carolina Bays are being removed from their natural condition. If the conversion of the bays from natural wetlands continues at the present rate, within a few decades most will disappear.

FLOODPLAIN AGROFORESTRY IN THE PERUVIAN AMAZON

by Wil de Jong and Christine Padoch, New York Botanical Garden, Bronx, New York 10458

A broad range of traditional agroforestry systems found on the terra firme lands of the Peruvian Amazon have been described. Recent research, however, shows that ribereno farmers living in or near the varzea of the lower Ucayali have also developed a great variety of agroforestry systems adapted to floodplain conditions. Data from the village of Yanallpa show that agroforestry patterns are limited by unpredictable floods and geomorphological changes. In their decision making riberenos using such areas appear to adopt strategies involving different levels of risk. This partly accounts for the variation in agroforestry patterns. Agroforestry systems do contribute significantly to both subsistence and cash needs, and supply food, medicinals, construction materials, and high quality timber.

NEW-TECHNOLOGY INDUSTRY FIRM CREATION, THE SEARCH FUNCTION IN REGIONS: A CONCEPTUAL FRAMEWORK, by Edward J. Delaney, Department of Geography, University of Washington DP-10, Seattle, WA 98195.

The paper articulates a conceptual framework for the exploration of the role firm creation plays in new technology industrial development in the context of regions. In particular, the function of the search for knowledge inputs used in non-routine decision making is focused upon in the pre-innovation phase of firm activities. A conceptual model is developed for assessing the role the search function plays in new firms in the biotechnology industry.

THE MEANING OF SAHELIAN WEATHER: DROUGHT AND HAUSA METAPHYSICS by James Delehanty, University of Wisconsin - Madison, N-383 Science Hall, Madison, WI 53706.

Dualisms are central to western thought. We hold nature and humanity in general opposition. We distinguish the instrumentality of day-to-day life and known properties of our physics from the realm of the supernatural. It is often assumed that non-western cultures have fashioned theories of being founded less firmly then ours on principles that oppose. In fact, classic studies in African cosmology point to dualisms not far different from our own: nature and society; the mundane and the metaphysical. The differences between western and African cosmologies lie not so much in first principles as in definition, and in the greater willingness of the latter to admit penetration between opposed realms.

During the twentieth century, Hausa-speaking farmers in central Niger extended the farming frontier north toward the marginally arable Saharo-Sahelian fringe. The decision to build farms on climatically precarious ground was founded, in part, on the assumption that climate was subject to indirect human control, that religious propriety and adherence to ritual practice offered hope for success even in a harsh land. Risk was a spiritual affair. Migration was a statement of spiritual confidence. In the mid-1980s pioneer farmers and their descendants in the northernmost Sahel endured a period of disastrously inadequate rain. Drought led not to a careful reconsideration of the objective wisdom of agriculture in the far north, but to assumptions of spiritual offense, and to religious doubt.

GIS AUTOMATION OF ARCHIVED VEGETATION MAP INFORMATION by Michael N. DeMers, Department of Geography, The Ohio State University, 103 Bricker, 190 N. Oval Mall, Columbus, OH 43210.

In 1956 professor A. W. Kuchler produced three distinct vegetation maps of southeastern Mount Desert Island, Maine based on separate classification methods. His purpose was to examine the utility of these different map classifications for selected uses. This research was a necessary inspection of the usefulness of vegetation maps to provide information appropriate for particular applications, however Kuchler was restricted by the manual cartographic methods of his time, and by the communication cartographic paradigm employed to produce these maps. By exploiting the analytical cartographic paradigm within a geographic information system (GIS) to optimize the functional capabilities of vegetation maps, a more comprehensive examination of Kuchler's work can be performed. In particular, the field data used to produce his maps can now be transformed to produce numerous classifications from which specific components of the vegetation can be inspected. The investigative potential of archived vegetation maps is greatly enhanced through their GIS automation, providing a substantially larger assemblage of potential uses than was possible before the advent of this new technology.

ETHNICITY AND ENVIRONMENT IN THE USSR: POLLUTING THE PEOPLE OF PERESTROYKA by George J. Demko, Dartmouth College, Rockefeller Hall, Hanover, New Hampshire 03755

Two of the major domestic strains in the USSR today are environmental degradation and ethnic dissatisfaction or unrest. The environmental problems range from the enduring impact of Chernobyl to ravaged biota and atmosphere in the Arctic to severe pollution in coastal waters. Ethnic strains and consequent protest and violence have become nearly epidemic beginning with the territorial dispute over Nagorno-Karabakh and extending to demands for economic and linguistic autonomy in many republics. These two issues are in large measure spatially coincident and mutually exacerbating.

This paper identifies the overlapping environmental and ethnic problem areas and examines the issues involved in each case. The various components of perestroyka (e.g., self-financing and cost accounting) are assessed in terms of their impact and role in these center-periphery strains. Finally, current government policies and proposals, central and local, relating to the resolution of the ethno-environmental problems are discussed.

PRIVATE INVESTMENT IN INNER-CITY HOUSING: TORONTO 1880-1920 by R. Dennis, Department of Geography, University College London, 26 Bedford Way, London WC1H 0AP, U.K.

In the context of current attempts to stimulate private investment in inner cities and to encourage responsible private landlordism, the aim of this paper is to examine the role of private investment in inner-city housing during an earlier phase of urban change. Toronto's population increased from 80,000 in 1880 to 500,000 by 1920. In two booms in the 1880s and 1900s, rents and land values increased rapidly, most new suburban dwellings were intended for owner-occupation, and inner-city landlords apparently took more interest in the long-term value of their property for commercial redevelopment than in maintaining or acquiring dwellings to let to low-income households.

The paper reconstructs changing patterns of house ownership in Toronto from information in directories, building permits and assessment rolls, and seeks to interpret change in the light of contemporary newspaper reports and inquiries, and by comparison with the behaviour of landlords in Edwardian Britain. The relative failure of landlordism is attributable to the growth of alternative outlets for investment by local capitalists, including one form of inner-city housing construction which did attract private capital: the building and renting out of upper- and middle-class apartments, imitative of major American cities and indicative of Toronto's burgeoning metropolitan status.

LINGUISTIC GEOGRAPHY AND THE THEMATIC CARTOGRAPHER: A REVIEW OF THE DESIGN CHALLENGE LURKING IN LINGUISTIC MAPPING by Borden D. Dent, Georgia State University, Atlanta, Georgia, 30303.

Linguistic geographers have been at work in this country mapping their research findings since the late 1800s, and somewhat later in England. Major early contributions include those of Harold B. Allen, Alvin L. Davis, Hans Kurath, Harold Orton, and more recently editors Frederic Cassidy and Craig Carver in the Dictionary of American Regional English (which contains maps that are a synthesis of others' works). None of these studies involved the participation of trained professional cartographers. As a result the volumes containing maps, and by extension in some cases word geographies that followed, suffer from limited innovative and creative symbolization schemata that they require. The nature of the data collection and sampling processes create difficulties for the quantitative thematic designer in developing appropriate symbol approaches. The present research delves into how a linguist and a map designer approached the problem of mapping for the Linguistic Atlas of the Gulf States map volume. Final map designs and products are the result of considerable discussion between the two and were reached by experimenting with alternative symbol techniques. The process was a difficult one and the final solution not perfect. Results of this collaborative effort are reported in this paper which makes two conclusions: (1) cartographers need to be involved early in the linguistic atlas effort for really creative design solutions, and (2) that although cartography has made giant strides in automation and computerization, creative symbolization and cartographic/geographic technique still remain at the heart of the cartographic art.

DIVERSIFICATION STRATEGIES IN THE RURAL-URBAN FRINGE SOUTH OF MONTREAL, by P. DesLauriers and C. Marois, Département de Géographie Université de Montréal, Montréal, Québec, and C.R. Bryant, Department of Geography, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.

Farmers in near urban zones face a number of pressures, urban as well as non urban. Farmer responses to these pressures do not simply lead to agricultural degeneration. Under certain conditions, some farmers respond by coping mechanisms while still others use more proactive strategies. These strategies include: 1) diversification of the farm structure either on the individual farm unit or in terms of a greater diversity of specialised farms; 2) the addition of non traditional farm activities on the farm, e.g. direct sales; and 3) the incorporation of non farm activities on the farm, e.g. on farm recreational enterprises. In this paper, the results from a sample of 148 farmers within a 30km radius south of Montréal are analysed. Diversification of farm enterprises is more common in this regional environment than field investigation showed in a similar environment near Toronto, and is also more common than the development of a greater variety of more specialised farms. Differences exist in the degree of diversification between areas based on the level of urbanisation and the nature of the "initial" farm structure.

FLOODPLAIN DEVELOPMENT IN A WANDERING GRAVEL-BED RIVER, BELLA COOLA VALLEY, BRITISH COLUMBIA by Joseph R. Desloges, Department of Geography, University of Toronto, Toronto, Ontario, M5S 1A1.

Laterally unstable, 'wandering' gravel-bed rivers are common in the Cordilleran region of western North America. Stable, single-thread reaches alternate with unstable, split reaches where substantial sediment accumulation occurs. Wandering stream morphology is transitional between meandered and braided conditions, however, an apparent persistence of the pattern indicates adjustment to the prevailing hydrology and sediment supply. The possibility for this type of behavior was brought to attention by Leopold and Wolman (1957). Evidence from Bella Coola River (A_d = 5050 km^2) and elsewhere suggests that floodplain development occurs in three ways. 1) infilling of back channels and sloughs following channel avulsion; 2) lateral accretion of gravel bars in sinuous river reaches and 3) overbank deposition of sands which gradually build the floodplain to its final level. The relative importance of vertical and lateral accretion in floodplain construction depends on reach-averaged channel gradient, frequency and size of slough channels, volume of sediment storage in the active channel and confinement of the main river by tributary alluvial fans. In Bella Coola River the recurrence interval of overbank floods varies between 1 and 2 years in laterally stable reaches but can be as high as 5 to 10 years in laterally unstable sections. This results in variable floodplain morphology, marked changes in sedimentary structures and age. Historically, there has been no degradation or aggradation of the alluvial valley fill.

INTERNATIONAL INVESTMENTS IN THE EUROPEAN ECONOMIC COMMUNITY by Marc de Smidt, Department of Geography, University of Utrecht The Netherlands.

In the face of "Fortress Europe" international companies are proceeding to change strategies. U.S., Japanese and Swedish corporate firms are dealing with a different locational tolerance area compared with preceding national differences in allocation of resources. Locational choice had been a two-step process, first deciding on which nation to choose, followed by selecting locations within this national realm. In the near future regional comparisons will attract more attention instead of national comparisons, taking into account the leveling of national conditions.

It is unlikely that there will be an increase in the number of locations established by foreign investors. For intra-European foreign investment economies of scale as well as economies of scope will result in a fierce selection of establishments. As far as non-EC investors are concerned, these processes will also operate. At the same time, acquisitions of EC firms will result in the opening up of markets in due course and therefore the necessity of establishing new industrial operations will be limited. Non-manufacturing activities will grow very fast, resulting in new establishments, in particular producer services located in leading metropoles. Competition of these cities for prestigious top-management activities will increase.

INNOVATION AND NEW FIRM FORMATION IN SOUTHERN CALIFORNIA'S MEDICAL DEVICE INDUSTRY by Jan Maarten De Vet, Department of Geography, University of California, Los Angeles, CA 90024-1524.

The Medical Device Industry has experienced a remarkable growth during the last two decades. A substantial portion of this industry is located in Southern California. Its core can be found in a very localized area in Orange County where over a hundred firms manufacture high technology medical products, primarily for cardiovascular surgery.

How can the location and growth of this largely undocumented part of Orange County's high technology complex be explained? I have chosen to focus on the concepts of product innovation and new firm formation. Empirical data from a survey among 350 Medical Device companies in Southern California will be presented.

Rates of innovation in the Medical Device Industry are high, as reflected in much new firm formation. New firms are typically established via a spin-off mechanism. The expansion of Orange County's Medical Device Industry has been reinforced by the emergence of specialized subcontractors (particularly in plastics molding), the availability of a largely Asian, female labor force, and the presence of local venture capital firms.

SEA-LEVEL RISE AND THIRD WORLD URBAN COASTAL HAZARDS by Neal Devine, Rutgers University, New Brunswick, New Jersey 08913

The Third World's urban population increased from 320 million in 1950 to more than 1 billion in 1980 and is expected to rise to 1.3 billion by the year 2000. Most of the Third World's largest cities are situated in coastal or deltaic areas, and the undeveloped shores immediately surrounding existing cities will accommodate much of the population increase as well as undergo great physical changes. These expanding urban coastal sites are often exposed to multiple natural hazards - including erosion, subsidence, storm surge and winds, volcanic eruptions, earthquakes, tsunamis, landslides, and flooding - as well as the hazards of technology, poor planning, overpopulation, overdevelopment, and loss of ecosystems.

This paper illuminates the massive local dislocations - to communities, agriculture, transportation, industry - and international repercussions - for trade, migration, aid - that can be expected from Third World urban coastal hazards (TWUCHs) under current projections of sea-level rise. Emphasis is placed on the human factor in the causes and effects of changes in coastal processes and the importance of understanding TWUCHs in the context of social, political and economic development policies characteristic of Third World urban areas today. A variety of research initiatives are considered that have implications for (1) increasing awareness of the TWUCH setting, (2) improving projections of rising sea-levels, and (3) assessing the First World's role in creating and mitigating these hazards.

THE PACIFIC RIM: A REGIONAL GEOGRAPHY by Michael S. De Vivo, Oregon Institute of Technology, Klamath Falls, Oregon 97601.

As the nineteenth century drew to a close, U.S. Secretary of State John Hay stated, "The Mediterranean is the ocean of the past, the Atlantic, the ocean of the present, and the Pacific, the ocean of the future." Nearing the end of the twentieth century, contemporary American statesmen as well as academicians view the forthcoming century as the "Century of the Pacific." The recent surge of interest directed towards the Pacific Basin has prompted several institutions to organize Pacific Studies programs and conferences. No doubt a regional geography course focused on the Pacific Rim would be in demand at many American colleges and universities. This paper offers suggestions concerning the content and structure of such a course.

A Climatology of Thermal Lags and Thermal Variability

by Kenneth F. Dewey, Department of Geography, 308 Avery Hall, University of Nebraska-Lincoln, Lincoln, NE 68588-0135

Daily maximum and minimum temperatures for 50 locations in the conterminous United States were collected for the period 1951-1980. The temperature curves for the minimum and maximum temperatures were then plotted and analyzed for the existence of Winter and Summer thermal lags. Thermal lags were defined as the number of days between the Winter Solstice and the subsequent minimum average high and low temperatures and, the number of days between the Summer Solstice and the subsequent maximum average high and low temperatures. A climatology of thermal lags was subsequently created in which regions of the country were delineated based upon the existence/non-existence of thermal lags and the nature or type of lag where there were thermal lags (for example, the lag magnitudes ranged from 0 days to as much as 6 weeks, and shape of the thermal curve varied from a sharply defined peak or trough to a broad plateau lasting several weeks). The nature of the Winter and Summer lags were compared. Synoptic explanations were then presented for this climatology of thermal lags. Average daily temperature ranges as well as daily average standard deviation of maximum and minimum temperatures were then computed for the study locations and subsequently plotted. A climatology of thermal variability was created from this analysis and resulted in the delineation of regions within the conterminous United States which had similar characteristics in the magnitude and timing of minimum and maximum thermal variation. Various significant singularities in thermal variation as well as significant breaks in thermal variation regimes were examined and evaluated within a synoptic context.

THE MANAUS FREE TRADE ZONE: CREATING AN INDUSTRIAL CENTER IN AMAZONIA by John DeWitt, Radford University, Radford, VA 24142.

The Free Trade Zone in Manaus, Brazil was authorized by the national government in 1967 as one part of an overall strategy to bring economic development to Amazonia. This vast region constitutes 42 percent of the national territory but, in 1971, had only 3 percent of the population. Through the use of a variety of fiscal incentives Manaus has been transformed from a sleepy river port to a thriving miniature Hong Kong in the heart of the tropical rain forest.

Using the results of field research, this paper describes the motivation for Amazonian development, the incentives used to create an industrial park in the free trade zone and the results of the program twenty years after its inception. Although industrialization has been impressive and the population of Manaus has soared from 200,000 15 years ago to more than a million today, Manaus has not yet become a growth pole capable of self-sustained economic development.

THE SPATIAL AUTOCORRELATION ANALYSIS OF LOCATION by Raymond J. Dezzani Department of Earth Sciences, University of California, Riverside, CA 92521

A variety of models exist to locate facilities and allocate functions to points and areas. However, there are few methods for analyzing extant patterns of location. The following discussion outlines a method utilizing the principles of spatial autocorrelation and autoregressive modeling to delineate location patterns and provide explanations of spatial behavior. Both discrete and continuous location problems are addressed. The discrete point problem employs discrete spatial autocorrelation techniques to examine the locational equity of facilities with public service functions. The continuous problem examines the problem of describing spatial interaction relations, of economic activities, and missing value estimation procedures for these processes in a central place context. The value of the procedures is that they provide an evaluative base for examining deviations from the central place interaction model.

GEOGRAPHIC USE OF LITERARY WRITINGS: AN INDIAN EXAMPLE by Ramesh C. Dhussa, Department of Geography, Drake University, Des Moines, Iowa 50311.

A large volume of geographic information is readily available in a source that has been almost untapped by geographers, the rich storehouse of literary writings, preserving invaluable information from ancient times to very modern days. By evoking geographical images, literary geography may illuminate a dimension of environmental knowing which other types of research endeavors are incapable of doing. The significance of the emotional aspects of environmental knowledge has crossed the boundaries of dispute.

The present paper examines the literary writings from the Mahabharata times and studies various images of Delhi evoked in those writings. Modern Delhi has been known by different names such as Indraprastha, Dilli, and Dehli during different periods in history. The very sequential nomenclatures of Delhi symbolize a different time period of history and cultural imagery. The images evoked in literature are also not identical as they vary in temporal, cultural and political aspects.

Mahabharata's Indraprastha (Delhi) was beautiful and was protected by golden walls to enclose the resplendent city. The most glorious age of Delhi occurred during the Mughal period, a time to be recalled nostalgically by poets of the 19th century like Ghalib, Hali and others.

SOIL EROSION AND LAND MANAGEMENT IN THE GRANITIC REGIONS OF GUANGDONG PROVINCE, SOUTH CHINA by Peter D. diCenzo, S.H. Luk, University of Toronto, Erindale Campus, Mississauga, Ontario, Canada L5L 1C6, and M.K. Woo, McMaster University, Hamilton, Ontario, Canada.

This paper to be presented in the form of a video provides a report on an ongoing project on soil erosion and land management in the granitic regions of Guangdong Province, South China. The three-year project was started in January 1987 and is funded by the International Development Research Centre, Canada. In this project, erosion processes were monitored in a selected basin with a drainage area of 0.9 km^2 in Deqing County. Instrumentation was established to monitor sheet and rill erosion and nutrient losses under a range of cover conditions; gully erosion and sediment sources; water and sediment discharge of the basin; and the micrometeorology of the basin, including aspect-related variations. Data obtained from two field seasons (1987 and 1988) indicate that in disturbed sites (where vegetation is removed for fuel), large amounts of sediment and nutrient are lost. However, ground cover (for instance, Bracken fern which regenerates naturally) of 25 to 50% can prevent 90% of the erosion which occurs on a bare slope surface. Results obtained from rainfall simulation experiments suggest that bed shear stress induced by overland flow is unlikely to initiate rills even on bare surfaces. Thus, many of the gullies appear to develop from shallow slope failures due to presence of discontinuities in the weathering profile. The bulk of the sediment exported from gullies is derived from displaced material accumulating at the base of the gully walls. Therefore, gully erosion control should be targeted at these sources to achieve its maximum effectiveness.

EUROPE 1992 AND STRATEGIC CHANGE IN THE INTERNATIONAL AUTOMOBILE INDUSTRY

by Peter Dicken, Department of Geography, University of Manchester, M13 9PL. England.

Western Europe is the world's largest automobile market and also the world's largest region of automobile production. Until 1986, with the arrival of the Japanese company, Nissan, the region's automobile industry was shared between a mixture of U.S. transnational producers and indigenous European producers, some of which also operate plants outside Europe. It is an industry in which, although a substantial degree of transnational corporate integration has occurred, the impact of historical circumstances is still evident in its locational structure. The current spatial distribution of automobile plants in Europe is the outcome of a complex and long-standing interaction (both co-operative and conflictual) between automobile producers and national governments. The European market is still quite highly fragmented. The imminent creation of a "single European market" after 1992 will remove at least some of the internal barriers to full transnational integration by the European-based automobile producers.

The purpose of this paper is to explore the strategies of the three major groups of automobile manufacturers in Europe: the U.S. transnational corporations, the indigenous European manufacturers and the newly-arriving Japanese companies (Toyota and Honda having recently announced their plans for major European manufacturing plants). A basic question to be posed is whether the single European market is likely to stimulate major strategic changes amongst automobile producers or whether we are more likely to see a continuation of existing strategies. Both possibilities have major implications for regions and communities within Europe.

CLIMATE CHANGE, DROUGHT, AND PERCEPTION: AN ENVIRONMENTAL PERCEPTION APPROACH TO UNDERSTANDING RESPONSE TO GLOBAL CHANGE by David M. Diggs, Natural Hazards Research and Applications Information Center and the Department of Geography, University of Colorado, Boulder, CO 80309.

In recent years, a consensus has emerged in the scientific community that anthropogenic climatic changes will have fundamental and cumulative effects on the earth's natural systems. How humans perceive, respond, and adapt to these apparently imminent changes, or simply to the information and predictions, is of critical importance to the field of environmental management. Specifically, this paper uses an environmental perception approach to understanding how humans might respond to global change. The study draws upon field work and a survey of 420 Great Plains farmers in North Dakota and Colorado. An environmental perception approach can illuminate some of the processes by which personal judgments of the amount, degree, and direction of climatic change are made. The extreme uncertainty and long-term nature of climate change make a perception approach both necessary and challenging. Examining the potential cognitive links between discrete, more discernible events, and climate change may provide an avenue for understanding perception and response processes. Future responses to climate change are likely to be a product of adjustments to discrete events such as drought, that cause immediate and recognizable stress.

MONITORING DEVELOPMENT PROJECTS GEOGRAPHICALLY by M. Dilley, Department of Geography, Pennsylvania State University, University Park, PA 16802

Geographical Project Monitoring (GPM) is a new concept which integrates the tools of Geographic Information Systems (GIS) and spatial analysis into the practice of development project monitoring, with a view to improving the quality of project implementation in countries of the developing world.

A project is the basic physical unit of operation and analysis in the process of economic development, as it proceeds from planning, to financing, and to implementation. Monitoring is conducted on an on-going basis in order to provide project management with information concerning inputs, outputs and effects. Currently, monitoring is carried out as an accounting exercise. Certain indicators of project performance are selected and periodically queried, usually in terms of "how much" and "how many".

GPM introduces the question "where", on the premise that project monitoring would be substantially improved through the adoption of a spatial methodology, including such techniques as map overlay, spatial sampling and spatial correlation. This spatial approach to monitoring is operationalized through the Computer Assisted Regional Planning (CARP) microcomputer system, developed at the Pennsylvania State University.

The concepts are illustrated with examples from Sri Lanka.

WHEELS ACROSS THE BORDER: TOURIST TRAVEL FROM THUNDER BAY TO DULUTH by Robert S Dilley, Department of Geography and Ken Hartviksen, School of Business Administration, Lakehead University, Thunder Bay, Ontario, P7B 5E1.

The nearest city of any size to Thunder Bay is Duluth, Minnesota. Despite being 320 km to the southwest it therefore forms a prime destination for short-term tourist travel. Over 60% of Thunder Bay residents surveyed by a stratified random telephone sample had spent some leisure time in Duluth within the previous five years, the median number of trips in that time being three. Over two-thirds of the rest had been there at some time. A majority of recent visitors expected to go on visiting Duluth with about the same frequency, although most did not see Duluth as significantly better than Thunder Bay for preferred activities.

Except for a few in chartered buses, everyone went by car, and very few considered the lack of an air link a problem, or were bothered by the need to pass through Customs and Immigration. The loss of the Duluth signal from cable TV was seen by some as lessening their interest in the city, but for most the principal factor affecting the decision whether to visit over the border was the exchange rate. Respondents had many more positive than negative comments about Duluth, with appreciation of the friendly people, the good shopping and the range of restaurants predominating. Many acknowledged the basic truth; that at least Duluth is a change.

POSTER: TERRITORIAL AND CULTURAL ETHNIC CLAIMS IN THE SOVIET UNION by Leo I. Dillon, Office of The Geographer, U.S. Department of State, Room 8742, Washington, D.C. 20520

Serious problems emerging from the distribution of Soviet ethnic groups have been exacerbated by increasing political and economic decentralization. With migrations of Russians to non-Russian territories, deportations of ethnic groups, and growing nationalist sentiments, the current administrative boundaries of the Soviet Union are being strongly debated. Soviet leaders face an unprecedented wave of public demands for territorial adjustments, greater cultural control of administrative units, and returns of territory either lost or redistributed.

This poster will illustrate actual and potential ethnic claims - territorial and cultural - in the Soviet Union. The focus is on the conflict between current administrative divisions and perceptions of cultural regions. This poster will also demonstrate the level of ethnic hohogeneity of administrative units and the proportion of major nationality groups residing outside of their traditional national units.

COMPUTER-AIDED MAPPING OF LANDSCAPE REGIONS USING LANDSAT MSS DATA by Mary E. Dillworth, Department of Geography, University of Kansas, Lawrence, Kansas 66045.

Regionalizations function as simplifications of landscapes, easing the organization and retrieval of spatial data. Typically, maps produced using remote sensing methodologies are more spatially complex than conventionally produced thematic maps familiar to most map users. This research examines a methodology for mapping regions using satellite data. Regionalization is attempted using spatial measures in conjunction with conventional spectral classification techniques. A geographic (as opposed to geometric) window is used to apply several spatial measurements to the spectrally classified data set. Four spatial measures (average patch size, standard deviation of patch sizes, land cover diversity, and patch interspersion) are tested in this regionalization of the Colorado High Plains. Comparisons between a visual regionalization of the study area and the computer-aided regionalizations indicate that some spatial measures are more valuable than others in regionalization. This computer-aided mapping strategy results in regionalizations with potential cartographic and ecologic applications.

FREEWAY PLANNING AND THE FREEWAY REVOLT IN THE SAN FRANCISCO BAY AREA by Dennis J. Dingemans, Department of Geography, University of California, Davis, CA, 95616.

This paper gives an history geography of freeway planning and construction in the San Francisco Bay Area. Although it is not as well known as Southern California as a center for innovation in urban freeway development, some of the nation's earliest comprehensive freeway planning and significant freeway construction took place here in Northern California. For example, between 1930 and 1955 the state's highway planners developed a clear model of their desired urban freeway structure in this area. This model's now-familiar forms included, as they do in most of the nation's urban areas, a set of radial routes out of the metropolitan center(s) and a set of inner and outer circumferential (beltway) routes.

Some peculiarities of local terrain and local politics explain why the Bay Area's freeway system remains uncompleted today when many other metropolitan areas have achieved their full complement of radials and circumferentials. A fairly well known "freeway revolt" in the decade after 1955 resulted in the deletion of some key routes at the heart of the metropolis. A less well known aspect of this revolt dropped several routes from the northern part of the region, contributing to the relative underdevelopment of this subregion in comparison with the thriving South Bay centered on San Jose and Silicon Valley. As another part of the Bay Area's environmentalism, an unusually strong regional commitment to the development of rail transit systems has provided an alternative to freeway construction, both during the era of planning for the BART system and during the current second wave of rail transit planning studies. The need for expensive trans-bay bridges, at first an incentive for early freeway construction, later became a barrier to the development of a full set of inner and outer circumferentials. The rugged topography of the Coast Ranges was also at issue in directing and limiting freeway construction in what is now the nation's fifth largest urban region.

RETAIL TRADE AREA SENSITIVITY ANALYSIS AT THE REGIONAL LEVEL: A CASE IN WELLAND ONTARIO by Paul G. DiRezze, School of Applied Geography, Ryerson Polytechnical Institute, 350 Victoria Street, Toronto, Ontario, M5B 2K3.

The first stage of this project was to conduct primary research so as to define a regional mall's (The Seaway MALL, in Welland) trade area via an on-site survey instrument. Further research describing the trade areas of surrounding regional centres was conducted using a household telephone survey of the entire region. The mall's trade area was then simulated utilizing a Huff-type spatial interaction model. The model made use of one mall attraction variable and one distance deterrence factor; each had a power parameter. The calibration procedure is described and the resulting power parameter values are graphically illustrated and explained. The model was then utilized as a prediction tool to estimate future trade areas of the Welland site after a planned mall expansion.

The resulting calibrated parameters (relating to distance and attractiveness) are explained in the context of regional social and geographic factors and with respect to existing literature. The results of the study are depicted on perspective maps of the region overlaid with three-dimensional flow surfaces representing mall patronage before and after the Welland site's expansion. The results of the analysis indicate that the Seaway mall can expect to increase its market share substantially through the expansion, taking market share in varying degrees from its surrounding competitors.

UNDOCUMENTED CITIES: ACCOUNTING FOR THE HOMELESS IN THE 1990 CENSUS by Catherine E. Dixon, University of South Florida, 4202 Fowler Avenue E., Tampa, Florida 33620.

The 1980s saw a heightened awareness of the existence and despair of homeless persons in the United States. Yet, there has been no agreement among experts about the actual number of individuals who are homeless. The very nature of using residential addresses for the purpose of census taking systematically excludes those persons who lack a place to call home. Estimates vary; between 250,000 and 350,000.

The U.S. Census Bureau implemented a plan to make a physical count of the homeless population on the night of March 20, 1990, in "Operation Shelter and Street Night." The plan called for Census representatives to visit cheap hotels and shelters and walk the streets to count the homeless between 6 p.m. and 4 a.m.

This paper provides some insight into this methodology and approach to making an accurate count of those persons who have previously constituted the "undocumented cities" in America - the homeless.

YUCATAN AFTER THE WIND: HUMAN AND ENVIRONMENTAL SITUATIONS A YEAR AFTER HURRICANE GILBERT by Clifton V. Dixon, Department of Geography and Planning, Memphis State University, Memphis, TN 38152.

A year after hurricane Gilbert passed across the northern Yucatan Peninsula, developers, *Yucatecos*, and tourists are still facing the consequences of the storm's impact and aftermath..

On the east coast of Quintana Roo, Gilbert's landfall pointed to the fragility of Isla Cancun; a 25 to 30 foot storm surge removed vast volumes of sand from the beach. Hotels built too close to the water's edge saw their foundation wash away, resulting in substantial structural collapse.

In the interior of the peninsula, almost 100% of the agricultural crop was destroyed. With substance for subsistence now gone, an almost immediate migration began as *campesinos* without a crop went to the east coast to seek wage labor. At least 12,000 construction laborers working at wages of $1/hour worked dawn to dusk for the next three months rebuilding the resort in preparation for the tourist season which began about December 15th. The 1989 agricultural year experienced early rains and summer long drought; many campesinos have experienced two years without a harvest and the incentives to remain away from their villages have remained strong.

By contrast, the north Yucatan coast represents a locus of domestic tourism and reconstruction of the extensively damaged beachfront structures and highways has yet to begin or is just underway. The Caribbean coast is experiencing a rapid return to a pre-Gilbert tourist landscape with continued developmental growth; the interior and north coast however will be years recovering from the worst personal tragedies in recent history.

SOIL FORMING PROCESSES AND QUATERNARY LANDSCAPE EVOLUTION IN THE COLORADO ROCKY MOUNTAINS by John C. Dixon, University of Arkansas, Fayetteville, Arkansas 72701.

An understanding of soil forming processes provides an opportunity to determine the nature and extent of Quaternary environmental change.

A variety of soil forming processes operating in the alpine and subalpine environments of the Colorado Rocky Mountains are interpreted to be potentially indicative of Quaternary climate change. These processes include soil horizonation, mineral transformations, eolian addition, cryoturbation, and paleosol development.

The degree of soil horizon development is extremely strong for soils developed on relatively young glacial and periglacial deposits. Clay mineral assemblages suggest the influence of vegetation in areas now lacking in vegetation, eolian silts dominate many soil profiles, frost disturbance is evident in many soils, and paleosols are present in some soil profiles.

All of these observations suggest that evidence for climate change might be elucidated from soils developed in alpine and subalpine environments of the Colorado Rocky Mountains.

SUQ EL-LAHAMIN: AN ANALYSIS OF AN ARAB MARKET IN THE OLD CITY OF JERUSALEMY by Norman Dlin, Louisiana State University in Shreveport, #1 University Place, Shreveport Louisiana, 71115.

The roofed-over market street, known as Suq el-Lahamin and located in the Old City of Jerusalem, has been in existence since 1152 AD. The street itself has been in existence since 70 AD. Within the span of 125 m the Suq is comprised of 83 shops with none of the shopkeepers owning the site of their business. The concentration of shops and obvious grouping of similar types of businesses led to the formulation of a questionnaire to help answer a series of questions some of which were: rent-ownership patterns, means of transporting merchandise to the shops, and shop hours. Of a more personal nature some of the other questions asked were: the amount of rent paid, marriage status, and the number of sons and daughters in each shopkeeper's family.

COASTWATCH: A GIS APPROACH TO MONITORING CHANGE IN COASTAL WETLANDS by Jerome E. Dobson, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831.

Coastwatch is the culmination of a long term effort by the National Marine Fisheries Service, National Oceanic and Atmospheric Administration to develop methods for periodic, synoptic monitoring of change in coastal wetlands. A prototype study has been completed for the Chesapeake Bay. The procedure involves a) supervised classification of satellite data, b) selective integration at pixel level with Land Use Data Analysis (LUDA) data provided by the U. S. Geological Survey, c) comparison with other sources such as the National Wetlands Inventory and county marsh inventories, d) spatial registration to a precision of 2.5'' latitude/longitude, e) ink jet plotting of high resolution maps, f) change detection over time at pixel level, and g) spatial aggregation as appropriate. This work was conducted by the Geographic Data Systems Section at Oak Ridge National Laboratory using Oak Ridge Geographics Software and an I²S Image Processing System.

THE VEGETATION TENSION ZONE ACROSS LOWER MICHIGAN'S THUMB AREA

by S. Dodge, Georgia State University, Atlanta, Georgia 30303.

Although vegetation tension zones have been studied elsewhere in the Great Lakes region, the pattern and cause of forest compositional change in Lower Michigan's Thumb area have not been identified. This study uses tree species data from original land surveys, modern soil surveys, and statistical analyses (regression and Student's-t) to interpret relationships between forest species composition and soils. A tension zone was identified by mapping conifer abundance within Thumb townships as a smoothed statistical surface. A steep slope on this surface indicates a pronounced change from forest dominated by deciduous species to one characterized by conifers.

This zone of forest transition trends southeast through the Thumb from Saginaw Bay to Lake Huron. A mixed coniferous-deciduous presettlement forest was predominant north of this zone while deciduous forest was characteristic to the south. Regression shows increased abundance of conifers is related to occurrence of somewhat to very poorly drained sandy and organic soils. Moreover, these soils are more common north of this tension zone. These results correspond to Medley and Harman's (1987) findings regarding soil-vegetation relationships across the central Lower Peninsula of Michigan.

CONDUCTING A SUCCESSFUL, EXTENDED FIELD EXPERIENCE IN PHYSICAL GEOGRAPHY

by Russell L. Dodson, Mansfield University, Mansfield, Pennsylvania, 16933, and Bryon D. Middlekauff, Plymouth State College, Plymouth, New Hampshire, 03264.

A smoothly-run field course requires a great amount of planning and preparation. Based in part on our experience of twice co-leading a three-week summer field class to New Brunswick, Nova Scotia and Newfoundland, we offer some insights and suggestions to others considering a venture of similar duration. In particular, we will discuss problems and solutions regarding space in the vehicle, meals, interpersonal difficulties, camp chores, meaningful activities and bad weather.

Of paramount importance is a prior knowledge of the area to be visited and advance reservations for campgrounds, ferry crossings and side trips. We strongly recommend two leaders. The physical and psychological demands of running such a course can be quite taxing at times and may be too much for one person to handle adequately. Several strenuous hikes are also recommended. Not only do students enjoy them, but the physical exertion can help reduce any tension that might develop in the group from extended periods in close quarters.

THE ROLE OF THE THIRD WORLD IN INTERNATIONAL MERCHANT SHIPPING

by Vernon Domingo, Earth Sciences & Geography, Bridgewater State College, Bridgewater, Mass 02325

This study examines the changing nature of international shipping within the context of shifts in regional and national power as well as fluctuations in wealth and productive capacity. From an earlier generally bi-polar American/European axis, merchant shipping has increasingly shifted its locus of control and operation so that today the Third World share has reached 28% (excluding flags of convenience). This paper examines the changes in control of shipping within the last two decades in the context of the "New International Economic Order". Questions of convenience flagging and labor policies are analysed as part of a model of the international shipping trade which sees maritime decisions as motivated by both economic as well as political considerations. Such a model must of necessity reflect the broader international political economy where the tendency for the "high" and "low" tech ends of the industry show signs of assuming the familiar configurations already existing in industries such as textiles and computers.

COMPARATIVE VISUAL ANALYSIS OF THE URBAN DESIGN STRUCTURE OF BOSTON, MASSACHUSETTS AND TORONTO, ONTARIO

by R. Donnell, Framingham State College, Framingham, Massachusetts 01701, and W. Massicott, Central Transportation Planning Staff, Boston, Massachusetts 02116.

This is a slide presentation focusing on similarities and differences in the urban design structure between Boston and Toronto during recent decades.

Since 1960, both Boston and Toronto have undergone significant changes in their economies that have resulted in changes in each city's urban landscape. Toronto has gone from playing second fiddle to Montreal to being Canada's leading financial, commercial, and cultural center. Boston has been the benefactor of the tremendous growth in the high technology industry of Massachusetts. Significant developments in modern office towers, hotels, convention centers, and condominiums have been the focus of waterfront renewal in both cities since 1970.

The presentation attempts to show how changes in each city's economy have contributed to changes in the urban structure and visual appearance of each city. Highlights of the presentation will show how mass transit has played an important role in determining the density of land use in each city, and how both cities suffer from having major highways located between the downtown and the waterfront.

LATITUDES AND ATTITUDES: THE SOUTHERN LIMITS OF NORTH AMERICA

BY William E. Doolittle, Department of Geography, The University of Texas at Austin, Austin, Texas 78712-1094.

Ethnic regions tend to change slowly and have boundaries that can best be described as transitional areas. In contrast, political regions change rapidly and have borders that are usually located precisely. These two conditions are perhaps no more evident and have no greater implications than in the case of North American Hispanics and the republic of Mexico. The border between the United States and Mexico, which is typically considered the boundary between Anglo and Latin America, has moved southward a number of times during the past few centuries. This movement has left one group of Hispanics, those north of the Rio Grande who are often called "Mexican-Americans," as foreigners in their native land. It has left another group, those south of the river, or Mexican nationals, as depreciated, or at least unappreciated, neighbors relegated to a resource-poor corner of the continent. This paper discusses the place of Hispanics and Mexico in North America. Emphasis is placed on boundaries and what has been called the "Border Lands," and the meaning of being a citizen of the continent. Relationships between people and place and between people in different places but who also share the continent, are elucidated.

ROLE OF SURFACE EXPOSURE DATING IN COMBINING PROCESS AND QUATERNARY GEOMORPHOLOGY

by Ronald I. Dorn, Arizona State University, Tempe, AZ 85287-0104

Three new approaches to surface exposure dating (SED) have been developed in the last few years: ^{14}C and cation-ratio analysis of rock varnish; *in situ* production of cosmogenic isotopes; and the calibration of soil properties. ^{14}C dating of organic matter incorporated into the bottom layer of rock varnish and cation-ratio dating of rock varnish yields minimum-limiting ages for surface exposure. Unstable cosmogenic isotopes such as ^{10}Be, ^{14}C, ^{26}Al, ^{36}Cl and ^{129}I and stable isotopes such as ^{3}He build up over time in rocks exposed at the surface. When calibrated by numerical ages, changes in soil properties such as weathering rinds and profile indexes also yield age estimates of surface stability. Each approach is based on different methodological assumptions and has different constraints. When utilized in tandem, they offer Quaternary geomorphologists age control at sites where material for stratigraphic age control by ^{14}C or K-Ar is lacking.

Studies of changes in geomorphological processes have largely been limited to contemporary, historical, and at best radiocarbon time frameworks. Many landforms at the earth's surface developed over longer times, during the Quaternary and Tertiary. These older landforms not amenable to process-based rate studies using conventional approaches. These new SED methods offer the potential to make process-based rate-controlled interpretations of Quaternary landforms. Alluvial fan, glacial, and lacustrine landforms in eastern California are used to illustrate how SED can aid in the integration of process geomorphology and Quaternary geomorphology.

THE STONE WALL LANDSCAPE OF THE GREEN MOUNTAINS by Jane Dorney, 59 Proctor Avenue, South Burlington, VT 05403.

Vernacular stone walls are relatively common relics of early New England farming, but have been little studied. This paper examines their distribution pattern at the landform scale in Vermont's Green Mountains.

Field and archival work was done in five Vermont towns. Maps of soils, glacial geology, and topography, along with eighteenth- and nineteenth-century road atlases and censuses were used in the analysis.

Stone walls do not occur uniformly throughout the Green Mountains, but are found on stony, glacial till soils, mostly between 700 and 1700 feet elevation on the south-facing slopes of stream valleys. The presence or absence of the stone wall landscape at this scale is mostly determined by the interaction of two factors: the farm locations selected by settlers in the late eighteenth and early nineteenth centuries, and locations of easily procured stones for wall building. Some physical factors affecting choice of farm sites, such as solar exposure and air drainage, were due to basic crop requirements. The cultural values of the time included preferences for certain soils and trees. Some factors affecting early farm siting, and therefore stone wall building, were complex interactions of the physical and cultural, such as settling away from river bottomlands to avoid flooding caused by deforestation.

DRAINAGE AROUND MARGINS OF EARLY AND MIDDLE PLEISTOCENE CONTINENTAL ICE SHEETS ON THE GREAT PLAINS by Wakefield Dort Jr., Department of Geology, University of Kansas, Lawrence, Kansas 66045

Late Tertiary drainage of the central Great Plains was toward the north and northeast, presumably proceeding to the Arctic Ocean or an ancestral version of Hudson Bay. Formation and expansion of Early Pleistocene continental ice sheets covered the downstream portions of these valleys, causing impoundments along the ice front. Lakes formed in all obstructed valleys. Overflow across low points in divides resulted in reintegration of drainage, always toward the south and east. Thus was created an ancestral approximation of the Missouri River.

It is clear that a large part of the central Great Plains and eastern slopes of the Rocky Mountains drained southeastward along the ice fronts during each episode of Early and Middle Pleistocene glaciation. The location of a large paleovalley sufficient for this high-volume flow is, however, unknown. This lack of information is especially vexing in relation to the line of farthest ice advance toward the southwest during the Pleistocene Epoch, that which used to be known as the Kansan terminus. Small segments of possible courses include a deep-valley ancestor of the Kansas River (the bedrock floor at the margin of glaciation at Kansas City is almost 240 feet below present floodplain) or the gravel-filled McPherson Valley that breaches the divide between ice-front Kansas River flow and the Arkansas River to the south.

ARCTIC WORLDS: AT THE NORTHERN LIMITS OF NORTH AMERICA, by Nancy Doubleday, Inuit Circumpolar Conference, Ottawa Ont. K1P 5V5

This paper compares and contrasts Arctic realities perceived by "others" with those lived by Inuit, the original people of the Arctic, and examines the implications of the conflict of these visions for the future of Inuit, of the Arctic, and of North America. Many researchers have examined the paradigms of indigenous peoples and others with regard to the northern limits of North America. This paper advances these discussions by setting a focus on issues of sustainable development in the Arctic, issues which have powerful implications for all of North America. The roots of the debate are as ancient as the origins of the peoples concerned: hence the value of reflections on historical experiences. The continuation of this debate will ultimately require resolution not only of environmental issues, but also issues of peace, social justice, and indigenous rights which touch us all. The stakes are high for all North Americans, for the outcome will shape our future and our destiny. American Identity undoubtedly has indigenous roots. To sever our connection with those roots may cost America its soul.

A DEVELOPING WORLD REFLECTION ON THE ROLE AND SUBSTANCE OF GEOMATICS by David H. Douglas, Dept. of Geography, University of Ottawa, Ottawa Ontario, K1N6N5

In recent years there has been such an emergence of interest in geographic information processing topics that there is much confusion as to which discipline it belongs. New programs in 'geomatics' are being established in survey science and engineering departments at universities almost every other month, and the technical colleges too have seen the drastic modification of what previously were survey and cartography programs. The shift of focus from geography to the technical and engineering centres was not unexpected, however it would pay to reflect upon just what the role of geography has been and will be, and what the impact on geography of these new and important technologies might be in the future. No environment can make the issues stand out more clearly than one of technology transfer to a developing country. In 1987 the author spent seven months at the Facultas Geografi at Universitas Gadjah Mada in Indonesia where he helped establish a program, curriculum and tools for a computer cartography teaching program similar to that found in many North American university geography departments. In September 1989 he began another consultancy at the Coordinating Agency for Surveys and Mapping (BAKOSURTANAL) where he assisted in curriculum development for the training of manpower for the government of Indonesia. The presentation will reflect upon the commonalities and contrasts between these two very different scenarios and draw upon the experience to reflect on the role of geomatics in geography.

CONCEPTS OF ENVIRONMENTAL CRISIS by Kirstin M. Dow and colleagues, Graduate School of Geography, Clark University.

The study of regions in crisis promises to offer insight into broader issues of global environmental change. Crisis regions: illuminate the interactions among the driving forces, perceptions, and responses attendant on change; provide insights into those interactions not achievable through analyses of global averages or global systems; and may serve as "canaries", warning of longer term and broader implications of global environmental change.

The notion of environmental crisis defines an area or problem as one requiring immediate attention. Examples include Himalayan and Amazonian deforestation, predictions of global modelling efforts, and the pollution of Lake Erie. Calls to action, whether directed to scholars, citizens, or governments, are underlain by often unexamined concepts of crisis. In the heightened environmental concern of the past twenty years, a number of concepts of crisis have been developed or reconsidered. No single clear definition has emerged.

These concepts differ in their conservationist to possibilist perspectives, definitions of sustainability, treatment of scale, identification of key elements or processes, and definitions of thresholds, losses, or goals. This paper will explore the overlap and conflicts between existing concepts of environmental crisis and attempt to clarify a definition of crisis.

MR. SAUER – THE MENTOR AND DISCIPLES, VIDEO AS AN ARCHIVAL THEMATIC MEDIUM I by Maynard Weston Dow, Geographers on Film, Plymouth State College, Plymouth, NH 03264.

Introductory comments and the showing of "Mr. Sauer" precede discussion on video as an archival medium, as well as, additional recollections about Sauer.

"Mr. Sauer" opens with Preston James and Carl Sauer recalling the latter's association with Rollin Salisbury and fieldwork in Mexico. Fourteen former students (Homer Aschmann, Henry Bruman, George Carter, Andrew Clark, William Denevan, Samuel Dicken, Leslie Hewes, Clarrisa Kimber, Fred Kniffen, John Leighly, Marvin Mikesell, James Parsons, J.E. Spencer, and Wilbur Zelinksy) follow commenting about their relationship with Sauer.

This session derives from two decades of producing 186 individual Geographers on Film interviews (fifty hours) and 39 Additional Holdings (forty-eight hours). The conversion of five distinct film and video mediums to the more efficient VHS format has facilitated the electronic splicing of segments of selected interviews into this sixty minute thematic presentation.

THE QR – REFLECTIONS (1971-1988) ABOUT THE QUANTITATIVE REVOLUTION IN AMERICAN GEOGRAPHY, VIDEO AS AN ARCHIVAL THEMATIC MEDIUM II by Maynard Weston Dow, Geographers on Film, Plymouth State College, Plymouth, NH 03264.

Introductory comments and the showing of "The QR" precede discussion on video as an archival medium and additional recollections about the Quantitative Revolution.

"The QR" is introduced with Harold McCarty and Richard Hartshorne describing their association with Fred Kurt Schaefer. Whence the Quantitative Revolution theme is developed by ten other geographers (Brian Berry, William Bunge, William Garrison, Donald Hudson, Clyde Kohn, Ross Mackay, Duane Marble, Richard Morrill, Edward Taaffe, and Edward Ullman). The departments at Iowa, Washington, and Northwestern (specifically their impacts upon the Quantitative Revolution) are emphasized.

This session derives from two decades of producing 186 individual Geographers on Film interviews (fifty hours) and 39 Additional Holdings (forty-eight hours). The conversion of five distinct film and video mediums to the more efficient VHS format has facilitated the electronic splicing of segments of selected interviews into this sixty minute thematic presentation.

AFRICAN HOUSEHOLD FOOD SECURITY: MECHANISMS TO COPE WITH CLIMATIC VARIATIONS by Thomas E. Downing, National Center for Atmospheric Research, Boulder, CO 80307.

African smallholder agriculturalists employ a range of strategies to cope with climatic variations to ensure an adequate measure of food security. The sensitivity of smallholder food security in Central and Eastern Kenya to climatic and economic variations depends on entitlements from subsistence production, market exchanges and donations. The analysis draws upon a household survey conducted during the 1984 drought, available data on agricultural yields, and models of household behavior in response to climatic and economic variations. Scenarios indicate the relative effectiveness of available coping mechanisms. Results suggest that market purchases are the most reliable mechanism to cope with short-term food shortages, but are vulnerable to economic conditions. Increased subsistence production, along with food storage, can substantially increase food security, but improvements are constrained by marketing problems in surplus years and competing allocation of labor in the monetary economy due to higher rates of return from wage labor compared to on-farm agricultural production.

THE FUTURE OF COLLECTIVE BARGAINING IN THE POST-FREE TRADE ENVIRONMENT by Daniel Drache, York University, North York, Ontario M3J 1P3, Canada.

Under the Canada-U.S. Free Trade Agreement (FTA), the Canadian economy, as the weaker partner in the trading bloc, faces considerable pressures for industrial restructuring. This process will be particularly severe for particular sectors and regions, but will also precipitate a general offensive on the rights and powers of labour across all sectors of the economy. Canadian labour's ability to respond to this challenge will be seriously handicapped by the highly decentralized system of collective bargaining currently in place. Furthermore, its position has already been undermined by a sustained offensive of the Canadian state against collective bargaining rights. This paper reviews these developments, noting both the economic and political significance of the FTA for accelerating the changes. It concludes by discussing possible new strategies for Canadian labour to adopt in a post-Fordist world.

A COMPARISON OF NATIONAL INTEGRATION IN CHINA AND INDONESIA by Christine Drake, Old Dominion University, Norfolk, Virginia 23529-0088.

National integration is a major concern in both China and Indonesia given their vast territorial extents and the great diversity of their peoples and regions. This paper compares and contrasts the challenges facing each country and their different spatial patterns and levels of integration. Political aspects of integration, such as the system of political administration and the treatment of minorities are compared. In the sociocultural dimension such factors as the use of a national language and acceptance of a national education system are examined. The interaction among the different parts of each country is analyzed, including the effectiveness of the transportation and communication networks. Differences in economic development levels in the various regions of the country and the level of overall economic integration are examined. In each dimension note is taken of government policies in trying to promote national integration. The study is based largely on an analysis of secondary sources but includes insights gained as a result of field experiences in Indonesia in 1985 and in China in 1989.

HOW TO MERGE FIRE WITH WATER: GIS AND PERCEPTIONAL GEOGRAPHY by K. Dramowicz, College of Geographic Sciences, Lawrencetown, Nova Scotia B0S 1M0.

This paper shows the results of a study combining all traditional approaches to cognitive map analysis. At the same time new opportunities resulting from the combination of traditional approaches developed in perception geography, psychology, cartography, etc. with the new technology: GIS, are presented.

The data for this study were obtained through maps and questionaires from three high schools from the central part of the Annapolis Valley, Nova Scotia.

At the macro-level (all - Canadian context) such problems as how students perceive the attractiveness of the environment of Canada and what their living preferences are, were investigated.

At the mezo-level the perception of Nova Scotia and the perception of the central part of the Annapolis Valley were analyzed.

At the micro-level problems such as map extension, map orientation, frequency of marked line, point, and polygon elements representing the best known locations in the town's vicinity, and the amount of cartographic information, were presented.

Additionally distance perception and personal mobility were investigated. The study has shown the usefulness of GIS technology in the analysis of problems from perception geography.

THE EFFECTS OF LABOR MIGRATIONS AND LAND TENURE IN RURAL UGANDA by Christine M. Drennon, Department of Geography, University of Wisconsin, Madison, Wisconsin 53706.

The most recent transition of political power in Uganda has finally brought stability to most of the countryside. With that stability, the government has had the opportunity to assess rural conditions, only to find environmental degradation, chemical contamination, deforestation, agricultural encroachment, and worsening poverty, in what once was described as the 'Pearl of Africa'.

Two cases of agricultural encroachment into Uganda's game and forest reserves have been examined. It is proposed that the establishment of the commercial agricultural sector, early in this century, necessitated an alternate population distribution than that already present. Thousands of people left the land to become labor migrants, traveling in search of work to a few key locations within the country. When this sector failed (shortly after independence) migrant laborers found themselves marginalized and unable to attain access to land through the traditional channels. It is these people that began settling and cultivating Uganda's game and forest reserves.

NEW DIRECTIONS IN THE CARIBBEAN BASIN INITIATIVE by S.L. Driever, Department of Geosciences, University of Missouri-Kansas City, Kansas City, Missouri 64110-2499

The Caribbean Basin Initiative (CBI) is a broad program of trade liberalization, tax incentives, and economic assistance between the United States and 22 beneficiary countries in the Caribbean and Central America for the purpose of stimulating economic development and stabilizing democratic governments in the region. The center piece of this initiative, the Caribbean Basin Economic Recovery Act (CBERA) provides customs duty-free access to the U.S. market for most Caribbean products until 1995. As the U.S. Congress is presently considering extending the CBI, the time is ripe to consider what changes in U.S. policy might emerge and what internal or intra-regional policies might be adopted by the 22 beneficiaries to further their economic development. The U.S. Congress is considering a 12-year extension of CBI, duty-free entry or limited duty-free entry of additional goods, and increased imports of Caribbean ethanol and sugar. Some of these proposals will be diluted or eliminated under pressure from domestic producers. In turn, the 22 beneficiaries must pursue new policies that also might meet domestic opposition where there is concern about greater reliance on external factors and the U.S. market. Both the U.S. and CBI countries must increase the mutual outward orientations of their economies and interdependency if the goals of CBI are to be realized.

GEOGRAPHICAL KNOWLEDGE AND THE NEW IMPERIALISM: H.M. STANLEY AND THE GEOGRAPHERS. By F.F.S. Driver, Royal Holloway and Bedford New College, University of London, England.

This paper examines the impact of an episode in the history of European geography (Stanley's expeditions in central Africa) in order to explore the place of geographical knowledge in the development of the 'new imperialism' after 1870. Stanley's approach to geographical exploration, and his much-celebrated 'discovery' of Livingstone in central Africa in 1871, in many ways embodied the cultural style of the new imperialism, and launched a new phase in the scientific and cultural appropriation of 'darkest Africa'. Yet Stanley's enthusiasm for both the new geography and the new imperialism did not go unchallenged. Amongst British geographers, there was considerable controversy over the motives and methods of his various expeditions. Elsewhere, within organisations such as the Aborigines Protection Society and the Anti-Slavery Society, there were forthright condemnations of Stanley's treatment of indigenous peoples. These debates, all but forgotten today, may be traced in the publications or learned societies and pressure groups, as well as in unpublished records and letters.

The paper uses the contemporary controversy over Stanley's expeditions to ask a number of questions about the relations between geographical knowledge and the new imperialism. While the new geography was clearly implicated in the development of new colonial strategies, the form it was to take and the functions it was to fulfil were actively contested, inside as well as outside the halls of European geographical science.

TEMPERATURE VARIABILITY IN MARYLAND by Don W. Duckson, Jr., Frostburg State University, Frostburg, Maryland 21532

Scholarly investigation of global warming has not yielded consensus opinions with regard to local temperature trends. Increased temperature variability is a cited response to global warming, but not every environment has experienced such an increase. This study attempts to determine whether a recent change in temperature variability has been recorded among Maryland stations.

Temperature variability was assessed using and index devised by Tavakol and Jones. Mean monthly and mean annual temperatures covering the period 1930-1988 were analyzed for seven Maryland stations. Although plots of five-year moving mean indices showed no clear increase or decrease in variability, regional differences in the nature of temperature variability were noted.

A KNOWLEDGE-BASED SPATIAL DECISION SUPPORT SYSTEM FOR USE IN THE CONSENT REVIEW PROCESS by Graham Dudley, Department of Geography, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.

In the Province of Ontario there are two methods by which the legal subdivision of land may take place. The first is through an approved plan of subdivision. The second is through what is termed a consent. The consent review process is viewed as being more expedient and less rigorous than the plan of subdivision process and, as such, has become a contentious issue in a number of jurisdictions. Due to the characteristics of the consent review process, it is possible that computer technologies such as geographical information systems, knowledge-based systems, and decision support systems can be utilized to assist in this decision- making process. This paper will discuss briefly the nature of the consent review process and describe a conceptual model of a knowledge-based spatial decision support system which could be used to aid decision makers reviewing applications for consents.

A CONCEPTUAL FRAMEWORK FOR THE ANALYSIS AND MANAGEMENT OF WILDLIFE-ORIENTED RECREATION IN THE COASTAL ZONE by David Duffus and Philip Dearden, Department of Geography, University of Victoria, British Columbia, V8W 2Y2.

There has been increasing interest in the non-consumptive use of coastal wildlife as part of the wide spectrum of nature and outdoor recreation. This is an important educational and economic activity, yet no jurisdictions in Canada currently have a great deal of experience involving the interaction between marine wildlife, ecosystems, and recreational users. The purpose of this paper is to illustrate the major components of recreational use of marine wildlife and show their roles and interconnections.

The conceptual framework is partially based on studies of interaction between recreational whale-watchers and killer whales at Robson Bight on the northeast coast of Vancouver Island. Research at that site clearly indicates the interactive role between natural science information regarding the wildlife/habitat complex, and social science information regarding the provision of recreational experience and management of human behaviour.

Of particular interest in the application of this framework in coastal and marine wildlife is the lack of scientific knowledge about the potential negative influence of human use on wildlife, and the lack of interpretive, educational, and enforcement protocols for the management of such activities. Examples from research at Robson Bight and other sites will be used to explore possible solutions and future directions for research.

RADIATION MODELLING OVER RUGGED TERRAIN USING REMOTELY SENSED IMAGERY by C. Duguay, Department of Geography, University of Ottawa, Ottawa, Ontario, K1N 6N5.

A method for mapping the spatial distribution of surface net radiation in mountainous terrain using Landsat-5 Thematic Mapper (TM) imagery and digital terrain data is presented. Digital terrain data are used for image registration, atmospheric corrections in satellite imagery and, together with a two-stream radiation transfer model, for the computation of shortwave and longwave irradiance. The visible, near-infrared and mid-infrared reflectance derived from Landsat TM are combined into a measure of albedo by use of a weighted average scheme. Landsat TM thermal Band 6 is utilized in the determination of surface thermal exitance. Predicted values of shortwave and longwave irradiance, as well as of surface albedo and thermal exitance are evaluated against field measurements and values reported in the literature. The proposed method using Landsat-5 TM imagery and digital terrain data yields data in good agreement with data obtained using traditional field instruments.

EVALUATION OF RADIOMETRIC AND MICROMETEOROLOGICAL INPUT PARAMETERS FOR EVAPOTRANSPIRATIONAL MODELING by Wayne P. Dulaney, Department of Geography, University of Maryland, College Park, Maryland 20742

Remotely sensed and micrometeorological data collected at the Konza tallgrass prairie during FIFE (First ISLSCP [International Satellite Land Surface Climatology Project] Field Experiment) are used as the input parameters for a resistance model of evapotranspiration (ET). The theoretical assumption of this model is that the flux of latent heat is directly proportional to the vapor pressure deficit between the substomatal cavity of a leaf and the surrounding air, and inversely related to the aerial and canopy resistance to water vapor flux.

A helicopter platform collected radiometric data which was used to compute the normalized difference vegetation index (NDVI). The NDVI values were used to create a surrogate parameter for canopy resistance. Aerial resistance was determined from wind speed measurements available through the network of micrometeorological stations across the Konza. Leaf surface temperatures obtained by the helicopter radiometer and humidity data acquired from the micrometeorological stations were used to determine vapor pressure deficit. The ET model results are compared with ground-truth latent heat flux data obtained from Bowen ratio and Eddy correlation stations.

THE CAPITAL IMPORTANCE: CHANGES IN ARGENTINIAN ECONOMIC, POLITICAL AND SOCIAL SPACE by Bernard Dunayevich

University of California - Los Angeles, CA 90024

Argentina has experienced extensive changes in its political social and economic spaces from the early colonial times to the mid 1930s. During the colonization period, the Plate territories that eventually became Argentina were of secondary importance to the Spanish crown. From there a series of cities were founded forming a wide arch towards the Atlantic ending in Buenos Aires which served as a link with the Metropole. The rapid increase in importance of this port and future capital of Argentina reversed the internal structure of the country. With the creation of the Viceroyality of the Rio de la Plata, Buenos Aires became the central place for the colonial commercial and financial capital accumulation. After independence in 1810 the city served as a base for the ruling coalition of traders and bankers. British investment in infrastructure (mainly railroads) established a pattern of links that funneled to Buenos Aires not only goods but people from the stagnating interior. With the arrival of the European immigrants the capital served in the early part of this century as a center of diffusion of the lifestyle, taste and customs of the western world.

ANCIENT ANTHROSOLS OF THE MAYA LOWLANDS by N. P. Dunning, Department of Geography, University of Cincinnati, Cincinnati, OH 45221

This study offers a general discussion of soil changes affected by prehispanic peoples in the Maya Lowlands of Mexico, Guatemala, Belize, and Honduras. Particular attention is given to soil changes associated with ancient agricultural practices, such as terracing, ridged and drained fields, and intensive dooryard gardening. Profile and structural changes in certain soils are examined. The use of total soil phosphate signatures to document relic agricultural features is also discussed. Much of the study draws on the author's field research in the Puuc region of Yucatan and Petexbatun region of Guatemala. The value of soil studies to archaeology is highlighted, particularly with regard to identifying the type, intensity, and history of agricultural practices associated with varied soil environments.

RESPONSES OF THE BUFFALO RIVER, WISCONSIN TO LATE-QUATERNARY ENVIRONMENTAL CHANGES by Richard D. Dunning, St. Olaf College, Northfield, MN 55057.

The Buffalo River, Wisconsin provides an excellent example of the rapidly changing character of a fluvial system during a time of very complex environmental changes. The objective of this project is to identify Late-Quaternary morphologic changes in the Buffalo River as examples of the processes by which streams respond to environmental changes. The project consisted of three general stages: mapping of terraces in the valley, sampling the sediments within the terraces, and detailed sedimentological analysis to identify stratigraphic units; definition of a historical sequence of events on the basis of topographic and stratigraphic relationships; and comparison of the Buffalo River record with regional environmental changes. The high terrace in the lower valley contains a particularly good stratigraphic sequence of the transition from Late-Pleistocene to Holocene. The terrace contains a complex sequence of silt and fine sands overlain by late-Wisconsin outwash, reworked outwash, and silty alluvium. The entire lower valley sequence was exposed by at least two periods of very late-Pleistocene erosional downcutting. Erosion in the lower valley initiated downcutting and terrace formation throughout the rest of the valley during the Holocene as the river was transformed from a braided to a meandering stream. The alluvial chronology in the Buffalo River Valley documents an example of the process of base level change and its effects on a stream system over a long period of time.

CONSTANTINE PORPHYROGENITUS AND THE GREAT TRADE ROUTE FROM THE VARANGIANS TO THE GREEKS by Demetrius Dvoichenko-Markov, Monmouth College, West Long Branch, New Jersey 07764

Constantine VII Porphyrogenitus 905-959 became the emperor of the Byzantine Empire at an early age as a minor in 913. General Romanos Lecapenos, his father in-law ruled in his name untill 944. Among the works written by Constantine, the book destined as counsel to his son and heir describing the geography and the nations of Eastern Europe is considered a very important primary source. Entitled as De Administrando Imperio, it offers us also important information and details about the trading expeditions down the Dnieper (Borysthenes) river. This forms part of the great trade route from the Gulf of Finland down the Neva river, Volkhov river, Lake Ilmen, Dvina river, Dnieper river to the Black Sea and Constantinople. Along this trade route the first medieval Russian principalities were formed. The Varangians (Vikings) used this trade route in their lucrative trade with the Byzantine empire uniting the Slavic tribes and creating the medieval state of Rus (Russia). In connection with this we find evidence about the development and the beginning of interior trade also. The Slavic tribes of Eastern Europe led a similar way of life even before the appearance of the Varangians. The Poliane, Severiani, Drevliane, Dregovichi, Krivichi, and the Rodimichi were self-sufficient agrarian societies who produced identical goods such as wheat, honey, wax, and furs. With the appearance of the Varangians two social classes were formed and international trade was introduced. Slavonic tribes tributary to the state of medieval Rus spent the winter in cutting down trees and hollowing them into "monoxyla" (single-strakers or boats). Then when spring came and the rivers were open again to navigation they floated these "monoxula" down the Dnieper river to the "mother of Russian cities" i.e., Kiev. Here in Kiev the "monoxyla" were sold to the ruling Prince and his retinue, who re-rigged these boats. The preparation of the yearly trade caravan is described in detail at the end of chapter nine. Each year in April and May Kiev must have looked like a great shipyard bursting with human activity. The Dnieper falls (cataracts, rapids) are described in detail. In spite of the many dangers involved this trade route brought great wealth to the participants.

THE LEGAL RAMIFICATIONS OF FLOODPLAIN DELINEATION A SOUTHWESTERN EXPERIENCE by Judith M. Dworkin, Meyer, Hendricks, Victor, Osborn & Maledon, Phoenix, Arizona 85004

Floodplain delineation and related regulation of activities within the floodplain have the express purpose of providing a nonstructural alternative for protecting people from property damage, injury and deaths that ensue as a result of floods. In Arizona County Flood Control Districts assisted by the Department of Water Resources are authorized by statute to delineate floodplains. The legislature has enacted some regulations enhanced by further regulation by the districts. Development in violation of floodplain regulations or statutory prohibitions is considered a public nuisance per se and may be restrained by the state or any political subdivision of the state. The legal ramifications of floodplain delineation and regulation are not, however, as clear as might be anticipated by reference to the statutory framework.

The purpose of this paper is to review the role which floodplain delineation had in two unrelated events on the Agua Fria River. The first is the impact which floodplain delineation had on proving negligence in the operation of dams to persons living in two small communities downstream of the dam and outside of the 100 year floodplain. The second is the impact which floodplain delineation has had on limiting the siting of a solid waste landfill within the 100 year floodplain.

GLOBAL PATTERNS OF INCIDENT PHOTOSYNTHETICALLY ACTIVE RADIATION EVALUATED WITH THE TOTAL OZONE MAPPING SPECTROMETER, by Dennis Dye, Dept. of Geography, Univ. of Maryland, College Park, MD 20742; Thomas Eck, Space Applications Research, Code 623, NASA-GSFC, Greenbelt, MD, 20771, and Samuel Goward, Dept. of Geography, Univ. of Maryland, College Park, 20742.

Information on the amount and distribution of photosynthetically active radiation (PAR) incident on the earth's surface is important for monitoring and modeling primary production in the biosphere. Research in this area has been constrained by the limited availability of solar radiation data for the globe. A new satellite remote sensing method is presented which provides spatially comprehensive estimates of PAR insolation at a spatial and temporal resolution suitable for global studies.

Ultraviolet (380 nm) reflectivity measurements from the Total Ozone Mapping Spectrometer (TOMS) on the polar-orbiting NIMBUS-7 satellite are used to quantify the magnitude of PAR attenuation by cloud cover and account for the reduction in PAR insolation from a potential (clear sky), model-predicted value. An initial study indicates that the method produces accurate estimates of monthly total PAR insolation for land surfaces not covered by snow or ice. In this study, the technique is used to generate global maps of monthly total PAR insolation for a six-year period. Seasonal and annual distributions of PAR insolation and their interannual variability are evaluated. Application of the satellite-acquired PAR insolation estimates in a satellite-based evaluation of global primary production is discussed.

RURAL GRASSROOTS INTERNATIONAL COOPERATION: THE CASE OF CHARLOTTE COUNTY, NEW BRUNSWICK AND WASHINGTON COUNTY, MAINE, by Floyd W. Dykeman, Director, Rural and Small Town Research and Studies Programme, Mount Allison University, Sackville, N.B.

Considerable social and economic benefits can be derived from community cooperation as part of a regional rural development planning and implementation program. However, it is most difficult to achieve. What is the likelihood that two adjacent counties with similar socio-economic and environmental surroundings, but divided by an international boundary, will develop a productive and workable cooperative management and development relationship?

The proposed paper will explore this question by examining efforts by two counties in Maine and New Brunswick to work cooperatively. The initiatives that have been taken to date, the underlying rational and process that has evolved and helped forge a working relationship, the successes and failures with the process, the potential benefits of a cooperative planning and development working relationship, and the opportunities for future initiatives including an enhanced or revised process of cooperation will be examined.

Key actors involved with the regional cooperation program will be interviewed including professional staffs at the Provincial/State Governments, local professional staff, planning commission/committee members, and locally elected representatives. A review of government files will also be used as a data source.

Three objectives will be achieved with the paper, (1) a description of the local efforts at grassroots cooperation, (2) the identification of facilitators and barriers as well as benefits to international cooperation at the grassroots level, and (3) an identification of new opportunities and associated organizational requirements for continued and expanded cooperative efforts.

AREAL ASSOCIATIONS OF VOTERS ON A HANDGUN LAW REFERENDUM IN MARYLAND by Robert Earickson, University of Maryland, Baltimore, Maryland 21228.

Based on an analysis of a handgun law referendum vote in 326 voting districts in the state of Maryland in 1988, a strong rural-urban divergence is noted. Rural voters are much more likely to oppose a handgun law than are urban voters. Within urban counties, socio-economic status affected the outcome: less affluent, black voters, and some upper-income white districts were more likely to favor a law restricting the manufacture and sale of certain handguns. Due to the greater number of voters in urban districts, the law was upheld narrowly, despite a massive spending campaign by the National Rifle Association.

THE ROLE OF SURFACE-ATMOSPHERE FEEDBACK IN THE MIDWESTERN DROUGHT OF 1988 by David R. Easterling and Richard L. Brinegar, Indiana University, Bloomington, IN 47405

Although much of the blame for the 1988 drought has been placed with negative sea surface temperature anomalies in the equatorial Pacific, many climatologists feel it was amplified and persisted due to local surface-atmosphere feedbacks. High resolution DMSP (2.7 km) are used to provide daily cloud cover amount and type for the area between 35° to 45° N and 80° to 95° W during the summers of 1987 and 1988. Palmer drought index values and AVHRR imagery are used for measures of soil moisture and surface temperature, for the same time periods. The summer of 1988 had far less cloud development, dominated by stratocumulus cloud, than the previous, near normal summer of 1987. Enhanced subsidence and drying with strong northwesterly flow during the first part of the summer of 1988 is indicated by weekly upper-air charts, with a shift to more zonal flow during the latter part of the summer. Preliminary results suggest that, once the upper-air ridge was established, a reduction in the latent heat flux and increase in the sensible heat flux due to surface drying helped perpetuate the 1988 drought into late July, until a weakening of the ridge allowed more rainfall-producing clouds to develop.

CAN THE AGRICULTURAL RESEARCH ESTABLISHMENT KEEP PACE WITH CLIMATE CHANGE? by William E. Easterling, Resources for the Future, Washington, D.C. 20036

It is plausible that, over the next few decades, the earth's climate will change more rapidly than at any time in human experience. Moreover, even in the unlikely event of immediate and drastic reduction of greenhouse gas emissions, the earth appears committed to some warming. How well agriculturalists will fare as the climate changes will depend in large part on how effectively they can adapt to the changes. Will policy changes become necessary to help agriculturalists adapt to negative climate changes or to seize the benefits of positive changes? In this paper, I discuss some examples of how agriculture has adapted to long-term environmental challenges that are analogous to climate change. I also discuss some results from an ongoing study aimed in part at assessing the ability of farmers to respond to a variety of climate change situations. Finally, I will suggest some policy strategies based on the above discussion.

GREAT LAKES HYDROLOGY AND HYDRAULICS by Anthony J. Eberhardt, P.E., Chief, Water Control Section, Corps of Engineers.

The presentation is an overview of the hydraulics and hydrology of the Great Lakes with some emphasis given to the lower basins; Erie and Ontario. The physical characteristics and relationship of one lake to the next are examined. The natural (precipitation, temperature, wind) and man-made (diversions, consumptive use, regulation) factors are described with an assessment of the dominant of the two on the levels of the lakes.

The role of regulation will be described. The regulation of Lakes Superior and Ontario (the two presently regulated lakes) will be examined. Considerations for further regulation (Lake Erie) as is being evaluated in the 1 August 1986 IJC Reference on Fluctuating Great Lakes Levels will be described. Previous studies which also considered Lake Erie regulation and full regulation of all Great Lakes will also be examined.

QUANTIFYING TROPICAL DEFORESTATION IN THE HUALLAGA RIVER VALLEY OF PERU by Fernando Echavarria, Geography Department, University of South Carolina, Columbia, SC 29208.

This research examines the quantification of tropical deforestation, the use of remote sensing techniques for its scientific measurement, and the many controversies surrounding the problem. Aerial photographs and Landsat-based planimetric maps were used to determine the conversion of montane rain forest in a 1,000 square kilometer sector of Peru's Huallaga River Valley. Between 1963 and 1976, 244 square kilometers of forest (approximately a quarter of the study area) were converted to agricultural and other land uses, an apparent deforestation rate of 19 square kilometers per year or approximately 1,872 hectares per year. Despite the photogrammetric limitations, the results demonstrate an economical and practical technique that is readily applicable to developing countries. The potential of other remote sensing systems and the application of change detection techniques such as digital image subtraction to monitor deforestation is detailed.

THE GEOGRAPHY OF 'ENDAKA' - INDUSTRIAL RESRUCTURING IN CONTEMPORARY JAPAN

by David W. Edington, Department of Geography, University of British Columbia, Vancouver V6T 1WT

'Endaka', or the rapid rise of the yen's value against the dollar since 1985 has had major implications for Japan's trading and industrial structure. Not surprisingly there have been impacts upon the type and location of employment within Japan. The purpose of this paper is to examine the spatial dimension of corporate and public sector responses to these changes brought about by 'endaka', and in particular the effect on the national and regional employment situation.

The analysis seeks to explore whether there has been a significant 'hollowing out' or 'deindustrialisation' of Japanese manufacturing since 1985, and whether 'endaka' itself has exacerbated traditional core-periphery relationships in Japan. Also of concern are how the various corporate strategies taken by Japanese industry have worked their way through the Japanese space economy, and how national and local governments have responded to the particular challenges of regional employment mismatch in the post-endaka period.

The paper commences by reviewing current broad-scale trends in employment - both nationally and by Japan's major regions and cities - as revealed in census data. Further insight into recent trends and outcomes is then provided from case studies, involving in-depth interviews with major corporations and public policy makers. The paper concludes that post-endaka outcomes have been complex: the hollowing out of Japanese industry is not a new phenomenon but dates from the 1970s; while the lion's share of employment gain has taken place in the service sector, some regions have continued to see new industrial growth; public sector intervention to facilitate the restructuring of declining areas, whilst problematic, has often involved creative solutions and vigorous implementation.

MENUMAP: A CARTOGRAPHIC MODELLING INTERFACE FOR THE MAP ANALYSIS PACKAGE

by Alan K. Edmonds. Department of Geography, The Ohio State University, Columbus, OH 43210.

The Map Analysis Package as implemented in OSU *MAP-for-the-PC* uses a command line interface with help and other information available through windows. The entry of commands in this interface severely hampers the interactive construction of cartographic models. Therefore, one stage that many designers use in the construction of the cartographic model is to diagram it as a flowchart.

The concept of MenuMAP is to combine both the generation of the flowchart for the cartographic model and the production of a command list to execute this model into one stage in the design process. MenuMAP allows the user to interactively construct and edit a cartographic model using icons to represent the various analysis operations in OSUMAP. After constructing the model on screen, a file can then be generated which may be used in OSU *MAP-for-the-PC* to execute the commands necessary to complete the cartographic modelling process.

Some of the advantages of this user interface include: 1) the ability to visually validate the model as a flowchart, reducing the time and errors in the modelling process, and 2) elimination of both errors in the typing of commands and in the proper order of entry for the operations in the model, by automatically constructing a command list that allows the user to run the model unattended.

OFF-SITE CULTURAL PALYNOLOGY IN SCOTLAND

by Kevin J. Edwards, School of Geography, University of Birmingham, Edgbaston, Birmingham B15 2TT, England.

The presence of humans in prehistory is best seen in the survival of archaeological monuments and artifacts. Such components of the cultural landscape may tell us little about the environmental or economic contexts of those who fashioned them, and in any case, agricultural and industrial activity over the last few hundred years in Europe has led to the widespread destruction of material evidence. Palynology provides methods for the detection of human impacts upon prehistoric and historic environments.

In theory, the location of pollen profiles on the sites of past human activity might be expected to provide the fullest and most sensitive records. In practice, this is often impossible for a number of reasons. The off-site location of pollen profiles enables the palynologist to examine the environmental history of more sites at the expense of certainty regarding the location of activity registered within the fossil record. A compensation is that use may be made of particular site properties to enhance the comprehensiveness of reconstructions.

Using examples from the mainland and western islands of Scotland, I shall demonstrate the value of off-site palynology to studies of human impact and environment.

Impacts of Highway Design on the Traveler and Landscape

Susan Edwards
University of Colorado-Boulder

The highway. We spend hours, as tourists and in daily travel, following it, often oblivious to its route and design. Yet, the cliche, "getting there is half the fun", can be ruefully incorrect. The design of a highway can either enhance or exacerbate both the human travel experience and the physical impact on the landscape. Design determines the level of safety (and degree of concentration for the driver), the visual experience, and the way in which roadside recreation and cultural opportunities are accessed and interpreted. In addition, despite attempts to minimize physical impacts, the construction and placement of a road is highly disruptive to natural systems. Using Vail Pass (located in central Colorado) as an exemplary case study, this research explores the repercussions of highway design, with an emphasis on recreation and visual experiences. Upon completion in 1976, Vail Pass won accolades for its innovative planning and construction techniques. The mountain was essentially rebuilt, forming a new "natural" landscape. Is the new drive experienced differently from the old one? Also, the new controlled, four-lane road eliminated the unlimited access to roadside recreation. How will this change patterns of recreational use and misuse? The construction of Vail Pass epitomizes a number of questions raised about the relationship between recreation, tourism, and highway planning. As Donald Appleyard wrote, the highway is a "book to be read on the run" (The View From the Road, 1976, p. 18).

SOCIAL POWER IN THE PRODUCTION OF SPACE,

by James Eflin, University of South Florida, Tampa, FL 33620-8100

An emerging theme in human geography conceives space as being socially produced. Considerable efforts have recently been made to forge a theoretical understanding of the implications for this theme in the development of modern social theories. Important among these are writings by Mark Gottdiener and Edward Soja, each of whom has tried to introduce the work of Henri Lefebvre to an Anglo-American audience. By tracing Lefebvre's "production of space" theme beyond its rhetoric and exploring it from a perspective of scientific realism, an underlying tenet surfaces: namely, that if space is produced socially, then the act of production itself must constitute an act of social power.

But "social power" is a concept which is not clearly understood, nor has it been fully articulated within a conceptualization of society and space. Ultimately, its connection with the "social production of space" resurrects the problematic of determinacy in social activity, and underscores the contingency of uneven development inherent in a capitalist mode of production. Before we can move toward a more complete social theory, then, it is necessary to articulate the connections between these processes.

This paper makes a contribution to this special session and to geographical theory by reviewing leading theories of power, articulating their connections with the dialectic of society and space, and providing comments on their applications to an understanding of the social production of space.

DEVELOPING RECREATION AND TOURISM OPPORTUNITIES IN HUMBERSIDE, ENGLAND

by Jane Ehemann, Shippensburg University, Shippensburg, Pennsylvania 17257.

The Humberside region of England is a rapidly growing tourist region. The purpose of this study is to explore the variety of especially non-urban based tourism and recreation opportunities, and to evaluate their economic impact or potential economic impact as well as to investigate the cultural and educational opportunities the development affords. The role of planning, or non-planning, in recreation development will be analyzed for a region that long based its economy on fishing and shipping activities and is now turning to a more diversified economy that will encourage visitors and residents the opportunity to explore the heritage of medieval villages or the promise of modern Enterprise Zones.

EMPLOYMENT LOCATION PERCEPTION AND PREFERENCE OF UNIVERSITY STUDENTS by J.M. Eichhorst, University of North Dakota, Grand Forks, ND 58202 and M. Hemmasi, University of North Dakota, Grand Forks, ND 58202.

University graduates form the core of today's skilled labor force. Their presence is essential for socioeconomic development and improvement of quality of life in a community. A person's perception of employment locations influence his/her preferences and future moves. Meeting technical needs and required services of rural and small urban places with "poor" images is especially important. This study examines traits university students perceive as attractive and unappealing when choosing their future employment location. Over 700 randomly chosen students at the University of North Dakota participated in a survey during the spring of 1989. An analysis of senior participants' responses are presented here. Traits perceived as attractive include the presence of services, outdoor recreation, a low crime rate, and ease of home ownership. Unappealing traits within North Dakota include poor economic conditions, lack of cultural activities, limited services, and geographic isolation. Regardless of their desire to stay or leave North Dakota, only 20% of the respondents cited climate as unappealing. Given opportunities within the state over one-half would choose to stay, preferring Fargo, Bismarck, Grand Forks, and Minot as employment locations. These results concur with past migration trends of rural/small town depopulation and urban concentrations in the state. Our findings would be helpful to policy makers and planners in their efforts to create conditions attractive to this highly mobile, but needed group.

CHANGES IN MAP LOCATION SCORES IN INTRODUCTORY WORLD REGIONAL GEOGRAPHY CLASSES by Julie Elbert, Geography and Area Development, University of Southern Mississippi Hattiesburg, Mississippi 39406-5051

Three sections of World Regional Geography students were given a map location quiz the first day of class. They were asked to locate a representative 25 locations of stated, countries or major water features. The students were to place the appropriate number on the blank world map provided for them.

The course proceeded with approximately one fourth of the four exams devoted to map locations. After the final exam, the students were asked to take the exact map location quiz again. Of the 124 students in the three sections, all but nine showed at least some improvement over the first quiz.

Other relationships to the scores were observed. Among them, but not limited to were: low and high scores did not improve significantly, but medium scores did improve significantly; low scores on the first or second quiz did not necessairly reflect the final course grade.

THE OVERGROUND RAILROAD: GRASS ROOTS RESPONSE TO THE HUMAN RIGHTS SITUATION IN CENTRAL AMERICA by G. S. Elbow, Texas Tech University, Lubbock, Texas 79409-1016

Two grass-roots movements have come into being in the United States in response to the wave of Central American refugees that entered the country beginning in 1979/80. These are the Sanctuary Movement and the Overground Railroad.

The Sanctuary Movement openly challenges the legality of United States immigration policy with regard to Central American refugees by sheltering illegal immigrants in churches. The Overground Railroad is a loosely organized collection of church congregations and other groups formed with the purpose of supporting Central American refugees in the United States who have applied for permanent resident status in Canada. Because it operates within the framework of the law, the Overground Railroad is more acceptable than the Sanctuary Movement to many mainstream church members. Refugees apply for asylum in the United States and receive permission to reside in the country while their cases are pending. Meanwhile, application is made for admission to Canada. Overground railroad affiliates agree to shelter and support the refugees in their communities until they receive permission to go to Canada.

This paper recounts the author's experience with Guatemalan and Salvadorean refugees who have been sheltered in Lubbock, Texas as part of the Overground Railroad movement. The paper also presents data on the effectiveness of the Overground Railroad movements as a means of responding to the continuing flow of Central American refugees into the United States and contrasts it with the better known Sanctuary Movement.

FUTURE DIRECTIONS IN LATIN AMERICAN GEOGRAPHICAL RESEARCH I, by Ernst Griffin, Department of Geography, San Diego State University, San Diego, California 92182, Richard Jones, Division of Social and Policy Sciences, The University of Texas at San Antonio, San Antonio, Texas 78285, Victoria Lawson, Department of Geography, University of Washington, Seattle, Washington, 98185, and Joseph L. Scarpaci, Urban Affairs and Planning Program, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24601. Organized by Gary S. Elbow, Department of Geography, Texas Tech University, Lubbock, Texas 79409. Chaired by Howard L. Gauthier, Department of Geography, The Ohio State University, Columbus, Ohio 43210.

Latin America is a region that is undergoing rapid and sometimes radical change. This change is paralleled by the development of new research thrusts and theoretical questions within the discipline of geography. This panel explores ways in which future research by geographers can contribute toward expanding our understanding of spatial patterns in Latin America. Specific topics that will be discussed include urban structures and economic development, population and migration, employment patterns and industrialization, and provision of health care services.

FUTURE DIRECTIONS IN LATIN AMERICAN GEOGRAPHICAL RESEARCH II, by Cesar N. Caviedes, Department of Geography, University of Florida, Gainesville, Florida 32601, David R. Clawson, Department of Geography, University of New Orleans, New Orleans, Louisiana 70148, Kent Mathewson, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, Louisiana 70803, and Susan E. Place, Department of Geography, California State University, Chico, California 95929. Organized by Gary S. Elbow, Department of Geography, Texas Tech University, Lubbock, Texas 79409. Chaired by Oscar H. Horst, Department of Geography, Western Michigan University, Kalamazoo, Michigan 49008.

Latin America is a region that is undergoing rapid and sometimes radical change. This change is paralleled by the development of new research thrusts and theoretical questions within the discipline of geography. This panel explores ways in which future research by geographers can contribute toward expanding our understanding of spatial patterns in Latin America. Specific topics that will be discussed include physical geography, peasant agriculture and farming systems, human ecology, and environmental preservation and conservation

THE SOURCES OF MANUFACTURING EMPLOYMENT CHANGE AND THEIR DETERMINANTS: DIFFERENTIALS OVER SPACE AND SECTOR by J. Douglas Eldridge, Ohio State University, Columbus, Ohio 43210, John Paul Jones, University of Kentucky, Lexington, Kentucky 40506, and Emilio Casetti, Ohio State University, Columbus, Ohio 43210.

Manufacturing employment change can be decomposed via an accounting framework into two separate effects, namely, changes in output and productivity. In this paper, we employ spatially and sectorally differentiated analyses to reveal variation in the sources of U.S. manufacturing employment change. These separate effects are calculated and mapped for several large manufacturing sectors. The magnitudes of job shifts they produce are then examined with respect to union activity, wages, and sectorally-relevant labor force characteristics. The regression analyses identify the sectorally specific determinants of the sources of job change, and in turn allow us to identify, via the accounting framework, the effects of such determinants on overall job change.

SPACIAL ASPECTS OF POPULATION GROWTH CHARACTERISTICS AND DEMOGRAPHIC CHANGE IN THE LOWER MAINLAND OF BRITISH COLUMBIA, CANADA - 1971-2006 by David S. Ellenwood and John T. Pierce, Dept. of Geography, Simon Fraser University, Burnaby, B.C. V5A 1S1.

Although projected fertility rates for B.C. and specifically the lower mainland of B.C. indicate that natural increase will be slow over the next twenty years, migration to this province will be relatively high compared to the rest of the country. This poster session is concerned with the distribution of growth and the shifting shares of total population resulting from in-migration to the Lower Mainland. The shifting of growth eastward away from urban core municipalities and into the predominantly rural parts of the Fraser river valley is particularly significant.

Mapping the growth rate forecasts by school district in the Lower Mainland revealed that districts in the valley, specifically Langley and Abbotsford, will maintain an annual average population growth rate of between 5 and 6 percent over the 1986-2006 period. Also, for the 18-24 and 25-34 aged population, these districts' share is projected to increase.

The presentation includes choropleth maps of the region illustrating spatial distribution of growth projections for total population and selected age cohorts, indices of population growth over time for 15 Lower Mainland school districts, and employment growth projections by municipality. Maps and diagrams are based on the March, 1989 release of population forecasts by the Central Statistics Bureau of B.C.

PSYCHOSOCIAL IMPACTS OF EXPOSURE TO ENVIRONMENTAL CONTAMINANTS IN ONTARIO by Susan J. Elliott, and S. Martin Taylor, Department of Geography, McMaster University, Hamilton, Ontario L8S 4K1

Public concern over the possible toxic effects of exposure to environmental contaminants is high in the wake of highly publicized events such as Love Canal and St. Basile-le-Grande. While attention has promarily focused on the possible physical health effects of exposure, psychosocial impacts of real or perceived exposure are receiving increasing recognition. In this paper, psychosocial impacts refer to the complex of dysfunction, distress and disability which are manifested in a wide range of psychological and behavioural outcomes in individuals. Environmental and health agencies in the Province of Ontario now recognize a potentially signficant role fo public information programmes in the reduction of psychosical impactsof exposure, particularly those linked to a lack of knowledge about the magnitude and extent of risks to health. A systematic and standardized assessment of primary research studies based on environmental epidemiologic criteria showed a mix of significant and non-significant associations for a broad range of exposure-impact combinations and therefore indicated no clear consistency in conclusions based on the strongest available evidence. Results also indicated conceptual and methodological limitations in past research. Clearly, another epidemiologic study of exposure-impact will not add to our stock of knowledge. This paper deals with the development of a methodology for examinaning the psychosocial impacts of exposure to environmental contaminants in Ontario. Given the limitations of past research as well as recent trends in both social and medical geography, the proposed methodology is founded on a combination of both quantitative and qualitative approaches.

A COMPARISON OF THE VITICULTURAL CONCEPT OF "TERROIR" BETWEEN BORDEAUX AND THE NAPA VALLEY: LEGAL ASPECTS, VITICULTURAL SIGNIFICANCE AND WINE IMPLICATIONS by D.L. Elliott-Fisk and A.C. Noble, University of California, Davis, California 95616

"Terroir" is a concept in viticultural that refers to the site characteristics of the vineyard, and more specifically the soil, that influence vine establishment, vigor, physiology and fruit and wine composition. The French are strong proponents of this concept, attributing wine distinctiveness within different communes in the Medoc and other regions to terroir. In contrast, California vitners have been slow to adapt this concept, although interest in the contribution of the soil environment to vineyard quality is increasing.

The terroirs of Bordeaux are contrasted here with Napa Valley. Bordeaux (southwestern France) is a low elevation, hilly landscape dominated by Quaternary glaciofluvial and fluvial terraces. All of the soils are derived from limestone, with several limestone formations serving as alluvial, and occasionally bedrock, parent materials. Climatic differences within the area are relatively minor and attributed to marine incursion and local cold-air drainage. The physical data support only minor variability in the terroirs between different appellations (e.g., the Haut-Medoc vs. Sauternes or Margaux vs. St. Emilion), although the French wine industry believes that terroirs are very diverse here.

In contrast, the Napa Valley of California has an extremely diverse geologic history, with soils derived from many types of volcanic, metamorphic and sedimentary rock formations. Quaternary and hypothesized pre-Quaternary soils are of many origins (e.g., marine deposits, alluvial, colluvial, etc.). Distinctive wines are produced from different soils in Napa Valley, yet terroir is not believed to be an important factor influencing the wine by many California wineries.

This concept has important implications for appellation designation both in the United States and abroad. French appellations are largely based on the concept of terroir, with vineyard and wine-making practices heavily regulated by the government. In contrast, the relatively new United States appellation system (ATF-53) approves geographical regions as viticultural areas (effectively, appellations of origin) based on toponymic (name), historical, and geographical criteria, the most important of which is vineyard geography. Although soils is an important aspect of this, very few viticultural areas have been approved based on their soils or other distinctive geographical criteria of viticultural significance. Vineyard regulations (e.g., type of trellising, irrigation) are almost non-existent. This contrast to the French system and its implications are discussed.

MODELING AIDS MORBIDITY AND MORTALITY IN FLORIDA by Mark Ellis, Florida State University, Tallahassee, Florida, 32306

AIDS morbidity and mortality data for counties and zip codes enable the investigation of several critical issues in the epidemic. By matching case reporting data with death certificates it is possible to estimate the effect of a range of characteristics on the survival of AIDS patients. In addition to demographic and risk factors, the location of diagnosis may have a significant negative effect on survival if medical or care facilities are locally unavailable. In these circumstances AIDS patients may enhance their survival times by moving to locations where there is expertise and capacity to care for them. The problems associated with monitoring and modeling this post-diagnosis mobility and survival time will be discussed.

A HYPERCARD PROTOTYPE OF A KNOWLEDGE-BASED GEOGRAPHIC INFORMATION SYSTEM by G.A. Elmes, and C. Yuill, West Virginia University, Morgantown, WV 26505, and M.J. Twery, USDA-Forest Service Northeast Experiment Station, Morgantown, WV 26505.

A knowledge-based geographic information system is being built as the foundation of an integrated decision support system for gypsy moth management in a range of habitats by a wide variety of possible administrative agencies. Knowledge-based approaches to decision support are at the forefront in natural resource management. A hypercard prototype allows potential users to contribute to the functionality and configuration of the system. Feedback from domain experts and end users will trap logical errors and interface problems. In addition prototyping fosters essential communication between the system design team and existing decision-making organizations; an aspect particularly important during the capture of existing managerial expertise. Hypercard and related software in the Macintosh environment has proven to be a versatile tool for presenting system structure, running mock-ups of basic decision-making operations and recording reaction and criticisms of the design. The demonstration illustrates the evaluation of risk of gypsy moth damage to forested land under data poor and data rich conditions. The entire decision support system is composed of interlinked modules providing functions from monitoring insect populations to implementation of recommended treatments. All GIS functions are designed to be provided by GRASS running in the AUX environment.

SIMULATED URBAN LAND USE (SULU): A COMPUTER ASSISTED DECISION STRATEGY by Susan M. Elshaw-Thrall, Lake City Community College, Lake City, Florida 32605.

The Simulated Urban Land Use (SULU) computer simulation program is proven to be effective as a learning aid for human geography and urban land use planning concepts. Participants in SULU act as trial decision makers for the development and planning of the urban landscape. Statistical analysis of participant responses on a pre-simulation and post-simulation test demonstrated that significant learning took place using SULU. Moreover, community leaders have successfully used SULU as a driving force for the creation of criteria for planning their own urban landscape and for anticipating real world interactions among people involved in the planning process.

RE-THEORIZING HUMAN-ENVIRONMENT RELATIONS by J. Emel, Clark University, Worcester, MA 01610 and R. Peet, Clark University, Worcester, MA 01610.

The unity of geography never comes closer to realization than in resource geography. At the juncture between society, analyzed by human geography, and nature, studied by physical geography, resource geography has the potential to impart coherence even to a reluctant academic discipline. And beyond the question of disciplinary coherence, lies the increasing significance of environmental and resource issues in the contemporary world. It would be difficult to find a set of issues which symbolizes more vividly the torment of a way of life gone astray, and which captures more exactly the potential for transformation.

We very briefly sketch the older, conventional views of resource management and hazards, summarize various lines of criticism of these views, and outline the emerging alternative conceptions of the socio-natural origins of environmental problems and hazardous events. "Political ecology" and other critical perspectives on humanity and "nature" shed considerable light on the social origins and effects of environmental degradation and catastrophe. In this newer geographical work, the contradictions of uneven (including "sustainable") development are revealed through the recoupling of environment, political economy and culture. We conclude with an assessment of the implications of these newer conceptualizations for geography as a social science and for practical action.

THE STATE AND INDUSTRIAL RESTRUCTURING: THE ONTARIO CENTRE FOR AUTOMOTIVE PARTS TECHNOLOGY (OCAPT) AND THE CANADIAN AUTO INDUSTRY. By Grant Emison, Department of Geography, University of Toronto, Toronto Ont. M5S 1A1

Descriptions of changes in the auto industry lack a sophisticated frame for analyzing the state's role in restructuring. They often dismiss the state as unimportant or see its actions as determined by the imperatives of capital (or some bargain between capital and labour). The paper explores the place of the state in guiding technological and industrial change through a detailed analysis of the formation, operation, and output of OCAPT. It finds that, in this case, policy can not be seen to flow smoothly from the requirements of capital. In fact, differing pressures faced by firms in the assembly and parts production segments of the industry made even the simple articulation of one set of requirements from capital problematic. The paper finds further that the form of the state affected policy outcomes and thus restructuring in the industry. Alternative perceptions of the possible character of technological change could be excluded, in part, because OCAPT's creation as a quasi-independent corporation insulated it from pressure from labour. Moreover, battles between OCAPT and the Centre for Advanced Manufacturing for control over funding of capital subsidies to firms in the industry was partially responsible for OCAPT's emphasis on training and organizational changes in its assistance to firms.

THE SUBURBANIZATION OF CLERICAL WORK AND THE SPATIAL ENTRAPMENT OF WOMEN by Kim V.L. England, Miami University, Oxford, Ohio, 45056.

The restructuring of the American economy has resulted in the expansion and suburbanization of routine office employment. Suburban locations offer many advantages including a large labor supply of relatively well-educated women whose heavy domestic responsibilities restrict their job prospects and job search area making them spatially entrapped. It is argued that firms employing large numbers of clerical workers are relocating to the suburbs to employ these women. This study will explore the applicability of this argument to the Columbus, Ohio metropolitan area.

A CLUSTER ANALYSIS OF DESERT MOUNTAIN DRAINAGE BASINS by Wayne N. Engstrom, Department of Geography, California State University, Fullerton, Fullerton, California 92634

A cluster analysis of 120 third order drainage basins in mountains in the Basin and Range physiographic province suggests that several factors influence drainage basin morphometry. Only drainage basins developed in granitic rock were studied. The morphometric parameters investigated were area, drainage density, relief, relief ratio, basin compactness, and basin elongation. Clusters dominated by drainage basins from the Sonoran Desert section are characterized by basins that are smaller and more dissected than those in clusters composed primarily of basins from the Great Basin section. Variations in landscape age and degree of erosional modification between the Sonoran Desert and Great Basin sections are believed responsible for these differences. Basins drawn from the Mexican Highland section, however, failed to form separate clusters. A cluster of extremely small and dissected basins are associated with areas that have experienced a protracted period of exterior drainage. Active tectonism is associated with a cluster of elongate Great Basin basins. Variations in the present-day climate and vegetation of the ranges do not possess any explanatory power. As the study is map-based, the relationship between morphometric parameters and lithologic factors remains unknown.

VISITOR'S PERCEPTIONS OF AUTHENTICITY AT OUTDOOR HISTORY MUSEUMS by Susan Enscore, Department of Geography, University of Illinois at Urbana-Champaign, Urbana, IL 61801.

Outdoor history museums are common features on the American landscape which attract large numbers of visitors each year. The restored or recreated village is probably the most popular manifestation of the genre. In many of these places, great care is taken by the administrators and staff to provide an historically accurate impression of the past.

This paper presents an introductory investigation of the relationship between visitors to outdoor history museums and the concept of authenticity. Do visitors desire authenticity? How is the authenticity of a particular museum perceived? What factors might affect visitors' perceptions of authenticity?

To determine the answers, data was gathered through a structured questionnaire administered to visitors at Billie Creek Village in Parke County, Indiana. The questionnaire contained a set of items relating to visitors' perceptions of authenticity, satisfaction with their visit, expectations and results of their experience, and general demographic information. 168 questionnaires were completed and returned. Through the use of statistical measures of association, significant variables were identified.

Results of the data analysis indicate that visitors place a high value on authenticity at these museums, that varying levels of authenticity can be perceived by these visitors, and that perceived authenticity is related to visitor satisfaction. Other findings suggest a possible connection between education and perceptions of authenticity, and an indication that physical site characteristics appear more authentic than do human ones.

AGRICULTURAL LAND CONVERSION IN AN URBANIZED REGION -NORTHEAST OHIO by Frank A. Erickson, Kent State University, Kent, Ohio 44242

This study is a conceptual overview of the process of agricultural land conversion and provides a framework for further analysis. Major ideas from the literature and the results of a questionnaire/field survey are analyzed in the regional context.

Two processes of land conversion operate in urbanized regions, one is controlled by location in relation to growth centers and farmland of all qualities taken. The other process operates across the broader region and opportunistically converts farmlands that have become marginal in some aspect. This creates a pattern of dispersed, piecemeal occurrence.

This study identifies the variety of physical, economic, locational, structural, personal and social reasons for farm marginality and/or farmland conversion to a non-farm condition. Precise measurement of each of these factors is beyond the scope of the study, but indications of their relative importance are found and factors generally neglected in the literature are identified. Factors of special interest include: 1) the decline of commercial farm support input and output services, 2) the dilution of the 'farm community' as a social motivation for inter-generational continuity and 3) the contrast of attitudes and motivations between part-time and full-time operators.

CORPORATE RESTRUCTURING AND REGIONAL POLICY IN SWITZERLAND by H. Ernste, Department of Geography, Swiss Federal Institute of Technology (ETH), Winterthurerstrasse 190, CH-8057 Zurich, Switzerland.

Some years ago, large firms in Switzerland had to break with traditional strategies concerning the organisational structure of the firm. Under the pressure of ever more segmentating markets they had to search for alternative strategies. In 1989 an explorative interview survey of a number trend setting Swiss firms indicated the emergence of a conceptual scheme for a new strategic approach towards the corporate structure. Many aspects of these newly emerging strategies resemble the concept of flexible specialisation based on decentralized networks of specialized, highly innovative and flexible independent firms or departments. These first results also show, that these strategies are not confined to manufacturing industries only but find application in the service sector as well.

This development was paralleled by a change of paradigm in federal regional policy. It steered in the direction of mobilising endogenous potentials for self reliant development, in stead of a 'welfare',oriented regional policy. The new paradigm specifically fosters networks of local initiatives and therefore supports the development of flexible specialisation in areas where this does not arise spontaneously. The convergence of these two strategic realms might be the basis for a prolongation of the 'Swiss success story'. The Swiss' neutrality and its smallness might give a number of degrees of freedom to experiment with alternatives in the field of a new regional and corporate organisation. This might very well have a high exemplifying value for other countries and regions. In Switzerland, flexible specialisation takes place in the context of a highly developed, globally oriented financial service sector. This poses important questions with respect to the relations between a global financial market place and flexible specialisation.

RESTRUCTURING OF SWISS INDUSTRY IN THE FACE OF EUROPEAN INTEGRATION by Dr. Huib Ernste, Dept of Geography, ETH. ETH - Z, 8092 Zurich, Switzerland.

This paper considers the potential impacts of the integration of the European Community from the perspective of a country -- Switzerland -- outside of the EC. Particular attention will be given to the restructuring of the mechanical engineering and watch industries and the consequences of this restructuring for regional development in Switzerland.

COMPARATIVE TERRAIN ANALYSIS OF EARTH, MARS, AND VENUS THROUGH DIGITAL TERRAIN MODELLING by Amanda Espy, and John M. Harlin, Center for Land Information Analysis and Mapping/Department of Geography, University of Alabama, Tuscaloosa, Alabama 35487.

Seventy-five percent of the topographic surface of Mars and Venus was digitized and complexed. The topographic data for Mars and Venus were entered into a digital terrain model (DTM) and compared to similar data for Earth. When comparisons were made for elevations above the ellipsoidal surface it was found that Earth and Venus demonstrated concave hypsometry. Mars, on the other hand, projects a convex hypsometric relationship. The authors concluded that the findings of previous researchers indicating rapid chemical weathering on Venus suggests that Earth and Venus have similar rates of degradation relative to tectonic processes. The hypsometry on Mars, however, may be driven by tectonic forces that far outweigh chemical and physical weathering processes and associated mass wasting.

PERCEPTIONS OF THE CAJUNS AND THEIR HOMELAND: REALITIES OR MYTHS? by Lawrence E. Estaville, Jr., Clemson University, Clemson, South Carolina 29634-1507.

The Cajuns, from the time of their eighteenth-century implantation into South Louisiana, have been considered poor, backward, and uneducated people isolated geographically and socially by dense swamps and vast marshes. These hunters and fisher folk have reportedly maintained the purity of their culture, including their language, with little change throughout the last two centuries, while at the same time completely assimilating all newcomers who ventured into "Cajun Country." Cajuns are only now beginning to change. Such is the essence of the voluminous litany of a fraternity of news reporters, popular writers, movie makers, and academic researchers as well.

This paper takes another look at the Cajuns and several issues that have spawned and perpetuated the foregoing perceptions: geographic and social isolation, little cultural change, language maintenance, assimilation prowess, occupational structure, poverty, and current commercial promotion.

AN HISTORICAL AND COMPARATIVE ASSESSMENT OF ECONOMIC DEVELOPMENT IN CALIFORNIA AND JAPAN by N. Ettlinger. Department of Geography, 103 Bricker Hall, 190 N. Oval Mall, Ohio State University, Columbus, OH 43210-1361

This paper contends that factors typically cited as being responsible for the evolution of Silicon Valley and Japan, Inc. after World War II represent the effects, not the causes, of processes that fostered competitive advantage. Accordingly, this paper identifies and compares pre-World War II development processes in California and Japan, focusing on the late 19th/early 20th century period. It is argued that despite numerous substantive differences between California and Japan, significant structural similarities existed in the formative development of these regions. Several interrelated conditions of economic change are common to early development in California and Japan, including an early history of relative economic independence, a diversified socio-economic structure, a propensity to generate investments and capital locally, industrialization strategies encompassing both export promotion and import substitution, and cooperation between the public and private sectors in an economy fueled by competitively structured private sector industries. The historical isomorphism in California and Japan suggests that the "miracles" in these two technopoles occurred well before the mid 20th century, and set the stage for rapid technological advance that was predictable. The identification of a milieu of features common to early development in two of the world's leading economic regions is critical both for appropriate policy formulation and for general theory.

THE DISTRIBUTION OF WELSH IMMIGRANTS IN THE USA IN 1900 by B. M. Evans, Department of Geography, University of Winnipeg, Winnipeg, Manitoba R3B 2E9.

This paper discusses the distribution patterns of individuals who were Welsh born or whose parents were both Welsh. Welsh 19th century migration to the USA has several peculiarities which mark it off from other British. Essentially the Welsh, most of whom until the end of the century spoke no or very little English, and whose social life was frequently dominated by adherence to strict Calvinistic religious sects, were intensely "ethnic," and generally settled in close knit groups which maintained identity for two or three generations. In addition, certain pioneers and promoters had enormous influence in determining the flow and location of migrants.

While the official census and other government records are frequently highly suspect, the unofficial records are usually detailed and informative.

In 1900, over 90% of the Welsh were found in six specific and discrete areas.

REFUGEES ON MAINLAND MIDDLE AMERICA: MOVING TOWARDS SOLUTIONS? by John C. Everitt, Geography Department, Brandon University, Brandon, Manitoba, R7A 6A9, Canada.

Although it is one of the world's major refugee generating areas, Middle America received, until recently, relatively little attention from either the media or the academic community. Refugees first made an impact upon contemporary Central America in the 1970s, and the problems of internal strife, particularly within Nicaragua, Guatemala and El Salvador, soon escalated to make this region one of the world's four 'hot spots' according to the UNHCR. The exact number of refugees is characteristically unclear, with only some 300,000 being 'official' [UNHCR recognised] refugees, but with over two million being the 'guesstimated' number of regional displacees. This numerical question is further complicated by the fact that it is often difficult to distinguish 'economic' from 'political' refugees, as well as by the deliberate low visibility of many of people who have fled for their lives. The social and demographic problems and the prospects of the refugees vary considerably depending upon the characteristics of the home country and the host country, but despite recent political changes in this 'arena', which suggest that some solutions are on the horizon for parts of the region, the future for most Mainland American refugees must still be viewed as bleak.

TURKEY'S MEMBERSHIP IN THE EEC: OBSTACLES TO AN ECONOMIC INTEGRATION by Ayse Evrensel-Brown, Clemson University, 216 Hardin Hall, Clemson, South Carolina 29634.

Turkey's relationship with the EEC dates back to July 1959 when the Turkish government expressed its wish to enter the Community. In June 1973, Turkey was granted an associate-member status. According to the EEC, an adjustment period of thirty years would be necessary before Turkey attained a full-membership in the early 2000s. As Turkey is approaching this time there are questions being raised on the part of the EEC whether the country has been on the right economic and political track for the EEC-membership.

My paper focuses on the economic aspects of this issue. It examines Turkey's economic structure, especially unemployment and its export structure; two subjects that have great relevance to the EEC.

My results indicate that very high rates of unemployment are seen as an obstacle to the country's full-membership in the EEC. Having by far the highest rate of population growth among EEC-countries and an inability to create jobs for this fast growing population causes concern about future prospects. In addition Turkey's export structure could present competition to other EEC-members such as Spain, Portugal, and especially Greece.

NATIONAL AND REGIONAL DIFFERENCES BETWEEN AMERICAN AND CANADIAN CITIES by Gordon Ewing, Dept. of Geography, McGill University, 805 Sherbrooke St. West, Montréal, Québec H3A 2K6.

Goldberg and Mercer in The Myth of the North American City: Continentalism Challenged (1986) provided suggestive evidence of national differences between American and Canadian cities on a wide range of social, economic and fiscal attributes. The presentation describes the results of research which analyzes their data further. In particular, using regression analysis, it factors out the contributions of race and city size to these differences. It then uses cluster analysis of the regression residuals to identify whether there are consistent national and regional differences and furthermore whether there are any cross-national regional similarities. The possible sensitivity of the results to statistical outliers and high leverage cases is also examined.

The results show that in the case of many variables there are distinct national and regional clusters, with some examples also of trans-border regional similarities.

MANDATED REGIONAL PLANNING: A CASE STUDY by Christopher H. Exline, Department of Geography, University of Nevada, Reno, Nevada 89557

The development of a land use plan on a regional scale involves a series of complex and often time intensive processes. This is particularly true if the region in question contains more than one incorporated municipal entity. An already difficult enterprise can be made even more cumbersome when a higher governing body creates legislation which mandates that a regional plan be developed for a particular area in an extremely restricted time frame.

This paper deals with a case study of the 1989 Legislative Session in the State of Nevada, in particular, Senate Bill 367 which required that Washoe County, Nevada create a regional planning commission, governing board and comprehensive regional plan. Although a complex web of governmental units exists in the study area, as do several sets of plans, the new law provided only 18 months for establishing a staff, hiring a director of regional planning, developing the plan, public input and adoption.

The entire process offers an intriguing look at the process of land use analysis and decision making.

INTERANNUAL VARIABILITY OF MOISTURE AND ARIDITY INDICES IN NORTHWEST OHIO by Gregory E. Faiers, Department of Geography, University of Pittsburgh-Johnstown, Johnstown, PA 15904.

The water budget is a valuable tool for gaining an insight into climatic variability. In that the moisture (Im) and aridity (Ia) indices, as developed by Thornthwaite, are both based on components of the water budget and are the basis for Thornthwaite's climatic classification, the variability of these values are significant indicators of climatic characteristics. Both Im and Ia values for northwest Ohio have been determined and also have been converted to climatic variability index values for the 1956-1985 period. Analysis of these indices reveals a remarkably consistant Im for the region since the mid 1960's with a much more wildly variable Ia. The only period of extreme variablity that was noteworthy in terms of the Im values was during the early 1960's. Ia values were highly variable during the early 1960's, mid 1970's and early 1980's. In the context of Thornthwaite's classification, these findings reveal that the overall climate (as revealed by Im) has not shown any tendency to change in the last twenty years while the more significant variability has occurred with the summer deficits (Ia). It is suggested that the aridity index should reveal changes in the regional climate system before the moisture index because of this higher level of sensitivity.

THE GEOGRAPHY OF INTIFADAH AND THE MAKING OF THE NEW STATE OF PALESTINE by Ghazi Falah, Galilee Center for Social Research, P.O. Box 2485, Nazareth 16124

What neither international political activity nor violent pressure from outside have been able to achieve -- an end to the Israeli occupation -- is now dramatically in sight, following the eruption of the Palestinian Uprising (Intifadah) in December, 1987. The Intifadah has significantly restructured the seemingly unchangeable set of relationships between a dominant power (Israel) and a subordinate population (the Palestinians of the West Bank and Gaza strip)

In this paper an attempt will be made to examine and analyse the spatial aspect of the Intifadah and draw up a framework for analyzing its five distinct geographical components, namely: economic disengagement, reinforcing the "green line" border, selective closing of roads to travellers, reducing Jewish colonization processes and reducing the movement of tourists in the occupied territories. The most serious consequences of these spatial components are: 1) they become an input that feeds the energies of the Intifadah and make it easier for Palestinians to continue it; 2) they reinforce the emergence of a well-defined territory for the future Palestinian state; 3) they effectively challenge the sovereignty of the occupier over this territory. In as much as the Palestinian inhabitants are determined and able to prevent any reversion of the situation to what prevailed prior to December, 1987, these changes are irreversible. Strong-arm tactics for putting down the Intifadah are ineffective, which means that the only viable alternative, a peace formula involving the creation of a new state beside Israel, is inevitable.

PERCEPTION OF CAMPUS LANDSCAPES AND FEAR OF SEXUAL ASSAULT: EFFECTS ON FEMALE UNDERGRADUATE TRAVEL BEHAVIOR AT THE UNIVERSITY OF NORTH CAROLINA AT CHAPEL HILL by Karen F. Falconer, University of Kentucky, Department of Geography, Lexington, Kentucky 40506-0027

Landscape perception is a complex process which affects the travel behavior of individuals. Undergraduate women at the University of North Carolina at Chapel Hill were surveyed by mail to determine the effects of the fear of sexual assault on their perceptions of campus landscapes and their travel behavior. A majority of the respondents fear sexual assault. Their perceptions and travel choices are affected significantly because of this fear. Most of the women in the study specified particular places on campus which frightened them and were able to describe the attributes of those places which made them fearful. Three areas of the campus were identified as the most frightening in which to walk alone after dark.

NEW DATA SUGGEST MULITPLE FILLS IN THE BUCK CREEK TERRACE by P. Falk, University of Kansas, Lawrence, Kansas 66045, C. Sorenson, University of Kansas, Lawrence, Kansas 66045, and E. Bell, II, Computer Sciences Corporation, John Hopkins University, Baltimore, Maryland 21218.

Within the Kansas River valley, variations in the thickness of Buck Creek terrace deposits and a wide range of gradients exhibited across these deposits, suggest that more than one terrace fill may be included among the Buck Creek sediments, which are supposedly of Illinoian age.

Three methods were employed to aid in differentiating individual terrace fills within the Buck Creek. The first method involved mapping soil associations on Buck Creek terrace surfaces. The second method involved plotting well log data collected for wells drilled within the study area. Surface and bedrock elevations along with locations were recorded for these wells, and these data were then converted to x, y, and z coordinates, which were used to produce computer generated three dimensional plots. Third, previous descriptions of the terrace fill were reexamined to determine whether differences in composition may have been missed.

When the data were analyzed concurrently several new features of the valley and its fills were clearly evident. These features which include buried valley fills, inverted sequences of buried soils, and lateral changes in soils along the terrace indicate the presence of at least two Buck Creek fills.

THE DYNAMICS OF GROWTH AND MANUFACTURING IN THE OLD INDUSTRIAL CORE: A CASE STUDY OF OHIO by C. Cindy Fan, University of California, Los Angeles, CA 90024.

The changes of a regional economy from growth to decline and the reorganization of the local economies accompanying these changes constitute important contemporary issues confronting the traditional cores of many developed countries. The role of manufacturing in fostering economic and population growth is often not replicated over time nor across the geographic space.

This paper is aimed at investigating the relationship between the manufacturing sector and the economic and demographic changes occurring in the traditional cores, and assessing the temporal and spatial variation of the relationship at a high level of spatial resolution. To this effect, Ohio is selected as a case study of regional declines in the old industrial core in the U.S.

The expansion methodology provides a philosophically and operationally compelling approach to the research questions posed in this paper. Results from the empirical analysis show that two-dimensional Fourier polynomial expansions are capable of resolving variations at a high level of spatial resolution. The findings suggest that in Ohio the temporal shifts of growth were the outcome of a combination of forces at the national, regional and sub-state levels. The net result of these trends was that manufacturing centers became the loser in both income growth and population growth.

JOSEPH MARTIN'S GAZETTEER by Charles J. Farmer, Frostburg State University, Frostburg, Maryland 21532.

Terry Jordan, in a recent AAG Presidential Editorial, noted the importance of early nineteenth-century gazetteers as a source for studies in historical geography. He lamented their relative obscurity and suggested the need to identify additional works of this genre, especially those concerned with the American South. In response, this paper analyzes various aspects of Joseph Martin A New and Comprehensive Gazetteer of Virginia, and the District of Columbia, published in 1836. Although uneven in coverage and cumbersomely arranged alphabetically by county, this work combines a myriad of geographic information on the Old Dominion prior to the period of more detailed census materials and, indeed, provides information never available at the federal or state level.

From among the many historical geographic themes that may be gleaned from the gazetteer, the following topics receive primary focus: (1) sources for information found in the gazetteer (2) urban (place) patterns (3) economic patterns (4) human ecology and (5) suggestions of research for historical geographers. A regional abridgment primarily emphasizes the southern piedmont and coastal plain of the state.

Of special significance are the rich (but selective) details on population numbers, racial composition, and occupational structure of small places such as hamlets and villages and, considering Virginia's long history of staple crop production, variations in soil productivity of small areas within certain individual counties.

THE INTEGRATED RURAL DEVELOPMENT PROGRAM IN INDIA by David Faust, University of Minnesota, Minneapolis, MN 55455.

The government of India has pursued two rural development goals: increasing food production and alleviating rural poverty. The principal program to eliminate rural poverty is the Integrated Rural Development Program (IRDP). The IRDP is intended to provide the poorest of the rural poor with a productive asset that they can use to earn sufficient money to bring their incomes above the poverty line. A survey in Varanasi District showed that the IRDP often fails to achieve its goal for two reasons. First the IRDP often does not reach its intended beneficiaries. Second, the IRDP serves primarily to alleviate a capital shortage, and thereby largely ignores the many other constraints on the ability of poor villagers to increase their incomes.

LAKE SEDIMENT AND POLLEN RECORDS OF HURRICANE DISTURBANCE ALONG THE GULF COAST OF ALABAMA by Miriam Fearn and Kam-biu Liu, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, Louisiana 70803.

Hurricanes are an important factor in the climate of the United States Gulf Coast. Sediment and pollen stratigraphies from the Shelby Lakes, freshwater humic lakes in coastal Alabama, can provide important proxy data to extend the historic hurricane record back in time. The "signature" of Hurricane Frederick (1979) and of other known storm events provides the modern analog for identifying prehistoric hurricanes.

During major hurricanes, sand eroded from surrounding dunes and beach ridges by wind and water is deposited in lakes and lagoons behind the barrier beach. The thickness and extent of sand deposition is expected to be related to the intensity of the storm. Hurricanes also affect the ecology of the area by introducing salt water and by damaging vegetation.

This study is based on sediment and pollen analysis of transects of cores from the Shelby Lakes. Multiple sand and plant debris layers occur in the cores with varying thicknesses and frequencies. Work is in progress to correlate and date these layers along the transect and to relate them to known hurricane events. Pollen data will provide information on long-term environmental change, hurricane impact on coastal vegetation, and lake sedimentation regimes.

EVALUATION OF TERRESTRIAL CLIMATE SENSITIVITY USING A MOISTURE INDEX by Johannes Feddema, University of Delaware, Newark, Delaware 19716.

Global monthly observations of temperature and precipitation, from 1951 to 1970, are used to evaluate global climate patterns and teleconnections. This particular time period was used because of the lack of data in several critical regions both before and after this time span. All precipitation and temperature stations in continuous use throughout this time period are used to obtain monthly 2° by 2° grid point estimates of precipitation and temperature on the terrestrial surface.

Using the Thornthwaite-Mather water budget approach, a complete water budget evaluation for the 20 year time period is made at each of the 3958 grid points. A modified form of the Thornthwaite moisture index is then used to evaluate terrestrial moisture conditions for each year. The moisture index is selected as a climate indicator because it is most sensitive to changes in marginal regions. Interest in these regions is emphasized because they are most crucial to world wide food production, and because they will be most severerly affected by global climate changes. Separate evaluations are also made for the Northern and Southern Hemisphere grid locations.

Statistical comparisons of grid point maps are then used to evaluate terrestrial moisture conditions for all years included in the study. Based on these statistics, like years are clustered to show similar characteristics between global moisture balances for those years. Global moisture regimes are thus identified, and teleconnection signals may be used to provide better climate forecasts. An attempt is also made to link such large scale features as ENSO to naturally occurring global moisture regimes.

CHANGES IN THE BANKING INDUSTRY AND THE RISE OF THE SUPERREGIONAL BANKS by Thomas S. Fedor, Department of Geography, Indiana University, Indianapolis, Indiana 46202.

During the present decade the most notable change in the banking industry of the United States has been the virtual elimination of geographic barriers to interstate banking. At present, only five states still prohibit the acquisition of home-based banks by out-of-state banks. Contrary to numerous predictions, the geographic deregulation of the banking industry has not been accompanied by a frenzy of acquisitions and mergers, nor have the large, money center banks expanded into a nationwide financial empire, nor have the financial resources of most states fallen under the control of banking centers located in a few states. Instead, the most significant change in the structure of the banking industry has been the growth of a small set of banks into a new size category termed the "superregional" banks.

Expanding rapidly through out-of-state acquisitions and mergers, these banks have acquired an asset base exceeding $15 billion which has placed them in a position to compete for financial markets directly with the very large, money center banks. The paper focuses on the growth in the number of these superregional banks, their location, the pattern of their expansion and the consequences on the changing structure of the banking industry.

Indigenous Dependency and Resistance in a Welfare State: Aboriginal Rights in Northern Quebec and Canada

Harvey A. Feit, Professor, Department of Anthropology,
McMaster University, Hamilton, Ontario, Canada L8S 4L9

This paper analyses recent initiatives for enhanced recognition of the rights of indigenous peoples within the Canadian state from the perspective of how they both disempower full autonomy, yet reproduce and extend the possibilities for sustained resistance and extended self-determination. Detailed case materials are examined from: the negotiation and implementation of the first modern land claims agreement in Canada, the James Bay and Northern Quebec Agreement; and from the constitutional, parliamentary and local political processes in which Indian self-government has been mooted and initiated. Areas in which agreement and successful implementation have occurred are contrasted with those areas in which conflicts have been unresolvable, and in which confrontation continues. Land, resources, funding and sovereignty remain, as they were in the past, central areas of confrontation; whereas new forms of resistance have included welfare-state aided revitalization of subsistence economies, taking political control of "the Indian problem," and extra-legal forms of resource use and self-determination. It is claimed that the exceptionally intensive political developments occurring in Canada over the last two decades provide a unique test of the limits of decentralization and autonomy within welfare states, and of the potentials for reproducing the conditions of resistance.

SHARING THE GLOBE - WHAT IS THE PROBLEM?

by Eran Feitelson, The Johns Hopkins University, Baltimore, Maryland 21218, USA.

The global environmental issues that attracted much recent attention can be viewed, essentially, as the problem of the commons on a larger geographic scale. The nature of the problem is not new. Yet, there is a need for systematic analysis of how geographic scale affects the ability to address environmental problems. A framework for such an analysis is suggested, based on the interactions between four dimensions: production-consumption relationships; distribution of benefits and costs of various activities; level of administrative control; and spatial scale of individuals' attachment to place.

Global environmental problems can be viewed as a case where the benefits from polluting activities are geographically concentrated relative to the costs (the opposite of NIMBY cases). The difficulty in addressing this type of cases stems from the discrepancy in geographic scale between the adverse impacts and level of administrative control. specifically, the geographic scale of adverse impacts exceeds the scale of control by existing institutions (mainly nation-states in the global case). The possibility of adapting institutional structure to the scale of the problems is examined, in light of the increasing spatial scale of production-consumption relationships in the post-industrial world and increasing demand across the globe for local control. The geographic scale of ideological attachment to place is identified as an important, yet under-studies, variable in determining the ability to respond to large scale environmental problems.

THE IMPACT OF CLIMATE UPON VARIATION IN AIR POLLUTION USING A SYNOPTIC CLIMATOLOGICAL APPROACH

by Jane Zhen Feng, Department of Geography, University of Delaware, Newark, DE 19716 U.S.A.

The Environmental Protection Agency has set national ambient air quality standards for six different pollutants: sulfur dioxide, nitrogen dioxide, ozone, total suspended particulates, nitrous oxides, and oxidants. The goal of this study is to evaluate the impact of climate on concentrations of these pollutants by applying an objective synoptic methodology which characterizes air masses in three different geographic locations in the United States.

A group of synoptic categories depicting the summer and winter weather in each city was developed using principal components analysis and average linkage clustering. The concentration of the six air pollutants were then related to these synoptic weather categories. Ultimately, the synoptic categories and associated weather conditions exhibiting particularly high pollution concentrations were analyzed in detail.

The characteristics of air masses associated with high pollution concentrations are: low humidity, moderate to high pressure, low to moderate visibility, low cloud cover, and light winds. These results support the notion that automated synoptic techniques can be used to evaluate the impact of climate on pollution concentrations.

THE IMPERIAL-MEXICALI VALLEYS: 20TH CENTURY COLONIZATION

by Raul A. Fernandez, University of California, Irvine, Comparative Culture, Irvine, CA 92717.

The Imperial and Mexicali Valleys occupy a part of the Salton Trough, a geologically-recent structural depression extending northwesterly from the Gulf of California to the upper end of the Coachella Valley. The unique climate of the Imperial Valley and the availability of irrigation water from the Colorado River combine to make this area one of the most important agricultural regions of the United States. The economic development of the Imperial and Mexicali Valleys in California (U.S.A.) and Mexico (Baja California) has virtually taken place in the twentieth century. In both cases government has played a crucial role in the orientation of economic policies. Irrigation has been promoted by both Mexico and the United States, although through different structures and mechanisms. The proposed research would identify the major periods in the economic evolution of both areas, compare the relative impact of such factors as land tenure patterns and government policies in the development of each agricultural economy and explore new areas of simultaneous economic growth, i.e., geothermal energy development and winter vegetable production.

HORTICULTURAL SOCIETY NOTES ON TREE PLANTING ON THE PLAINS, 1872-1902

by J. Ferrill Northern Michigan University, Marquette, MI 49855.

Some men dream -- and plant trees. Others, more "practical," plant corn -- and watch the dust blow. When the dreamers live on the "Great American Desert," the tree planting takes a strong sense of dedication, a reasonable amount of courage, more than a small bit of humor, and a great deal of love.

Many of the early tree planters were members of the state horticultural societies formed on the plains in the late 1860s. Their ranks consisted of farmers, poets, professors, governors, a U.S. Secretary of Agriculture, and a few housewives. These early pioneers of the plains banded together with one goal - to cover the "desert" with trees, flowers, and vines. They planted trees, they encouraged others to plant trees, and they gave us a glimpse of their perceptions and attitudes in the recorded minutes of the societies to which they belonged.

This paper attempts to reveal some of these perceptions and attitudes, comparing the early years to the later ones, and Kansas to Nebraska. However, since this is a paper of dreams -- successes and failures -- let them stand by themselves, without interpretations or conclusions.

BLACK LONG-DURATION UNEMPLOYMENT IN THE U.S., 1981-1988

by John B. Fieser, Economic Development Administration, U.S. Department of Commerce, Washington, D.C. 20230.

Like their white counterparts, black total and long-duration (27 weeks or longer) unemployment rates have declined every year since their most recent peaks in 1982 and 1983. However, black total unemployment rates are almost always at least twice the white rates and black long-duration (or chronic) unemployment rates are always about four percentage points above the white rates. Furthermore, for the combined 15 states with the largest black populations (states having detailed black unemployment data since 1981), the yearly black portions of all unemployed (23-27%) and the long-term unemployed (28-33%) far exceeded the 14.1% black in the total population of those states. Yearly changes in black total and chronic unemployment rates are "negatively" correlated with the business cycle: the unemployed are more heavily black during expansions than during recessions. A simple hypothesis that blacks are the last hired and first fired would not alone explain this negative relationship. The black component of chronic unemployment acts much as the common definition specifies: those who remain unemployed even in expansions. Conversely, the white component fluctuates positively with the business cycle as if it were only cyclical unemployment. State-level black chronic unemployment rates for recessionary 1983 are highly correlated with state-to-state variation in unionization and durable goods manufacturing (both pos. *r*); for expansionary 1988, with labor force participation rates and dollar exchange effects (both neg. *r*).

PRICE COMPETITION AND LOCATION: SOME EMPIRICAL FINDINGS by Timothy J. Fik, Department of Geography, University of Florida, Gordon F. Mulligan, Department of Geography & Regional Development, University of Arizona.

This paper examines price competition among five major retail chains in the Tucson metropolitan area over a six week period. The discussion includes a presentation of the results of nearest-neighbor and point-pattern analyses on the distribution of individual outlets, and confirms the existence of competitive clusters among rival chains. By constructing unweighted Thiessen polygons, measures of spatial dependence in price and services for adjacent market areas (nets) are computed and the pattern tested for regularity. Statistical associations between reported price levels and distance to nearest and next-nearest competitor(s) are established and distance-decay properties highlighted. Relationships between price and the characteristics of consumers contained within Thiessen nets are also examined. These results reinforce earlier findings on the direct association between retail price levels and distance to nearest rival. In addition, it is demonstrated empirically that price-distance relations decay over space.

THE CLASS AND GENDER RELATIONS OF THE LOCAL STATE by Ruth Fincher, University of Melbourne, Parkville, Australia 3052.

Dramatic changes in the activities and alliances of urban governments have occurred in capitalist countries in the last decade. Examples of these are briefly reported, and a review made of the literature on the political economy of the local state that is associated with these events. More recently, the intertwined class and gender relations of the local state have been taken up in the literature. The richness of a socialist feminist analysis of the social relations of the local state is described.

The paper concludes with examples of the subtle ways in which the class and gender relations are perpetually shifting, and the causes of this. People's daily lives in urban communities are constructed around these, in the local state as an arena of conflict about class and gender, as much as they are affected by the dramatic alterations to the status of local governments that prompted the political economy literature.

THE GERMAN DEBATE ABOUT GEOGRAPHY AND RELIGION by Linda K. Fischer, Richard Bland College of the College of William and Mary, Petersburg, Virginia 23805.

A lively debate about the relationship between geography and religion is currently being pursued in Germany. Opposing positions are held by Martin Schwind and Manfred Büttner, both professors of geography. Schwind takes the stand that the geography of religion should be the study of the effect of religion on the environment. Büttner does not agree. He calls on geographers of religion to join theologians and students of religion in discussing a means of synthesis, and in creating a "metadiscipline." Büttner thinks that without constant communication with the other disciplines geographers do not have the background needed to investigate the tie between religion and the earth. For Büttner, the relationship between the two is a dialectical one. Environment and religion are constantly affecting each other, a change in the belief system leading to a change in the environment, which, once changed, stimulates a consequent change in the belief system. He has developed the "Bochum model" to explain this interaction.

This paper discusses the reasons for the development of these two positions and offers a third possibility for defining the scope of the geography of religion. Instead of constricting it to the study of the effect of the environment on religion (Schwind), or insisting that it is an independent discipline (Büttner), developing it as a subfield within the discipline of geography better serves the interests both of geography and of the geography of religion.

NETWORK ROUTING USING SEARCH IN AN ARTIFICIAL INTELLIGENCE ENVIRONMENT by Peter F. Fisher, Department of Geography, Kent State University, Kent, Ohio 44242.

All artificial intelligence programming involves searching for solutions among a large array of alternatives. The methods of search have thus been extensively researched in the AI literature. Many introductory textbooks for both AI in general and AI programming apply those search algorithms to networks. The program to be demonstrated here, applies two search procedures (breadth-first search and a variant of branch-and-bound search) to an actual street network. The first method searches for the route with the minimum number of intersections, and the second for the shortest route. The program accomodates no-left and no-right turns and one-way roads. The user interface is entirely graphics oriented, and the selection of starting and destination nodes is by interactive movement around the graphics screen. Source code and executable versions of the program are included, and it is hoped that this graphic demonstration of artificial intelligence search may increase geographer's interest in that area.

VEGETATION STRESS DETECTION USING A DAY\NIGHT TM SIMULATOR DATA SET by Michael Timothy Fitzgerald Geography Department, San Francisco State University, San Francisco, CA 94123

Vegetation stress and die-back is a major concern of many disciplines. One concern, in particular, is that of fire hazard and fire-fuels management. In the western drought prone regions where large blocks of open space exist in close proximity to housing and commercial developments there is an immense concern with the amount of stress and die-back of vegetation. Detection and delineation of these areas of vegetation stress is desirable in order to help predict areas of high fire danger and for management of prescribed burns. Day-night data sets of a series of study areas were acquired by the Daedalus Thematic Mapper Simulator, flown on board the NASA ER-2 aircraft. This paper will show whether thermal nighttime imagery contributes any unique input into the data set for determination of vegetation stress. Various spectral band combinations and classification techniques will be applied which will emphasize temperature differences and demonstrate the significance of this nighttime data.

CONCEPTIONS OF NATURE AND ECO-POLITICAL ECONOMY
by Margaret FitzSimmons, Graduate School of Architecture
& Urban Planning, UCLA, Los Angeles, CA 90024

As Raymond Williams pointed out, nature provides us with one pole of all the great Enlightenment antinomies: nature and society, nature and culture, nature and nurture. Nature is thus seen as external but also constructed in metaphor:

> "'Nature is...' -- What? Red in tooth and claw; a ruthlessly competitive struggle for existence; an extraordinary interlocking system of mutual advantage; a paradigm of interdependence and cooperation" (Williams, 1980, Problems of Materialism and Culture, 80).

Current efforts toward a theory of human-environment relations have intellectual roots in two distinct nineteenth century traditions -- human ecology and marxism -- each with its own conception of nature-as-external. Human ecology found its fount of historical (and geographical) change in the relationship between humans and external nature and has tended to disregard social relations; in contrast, marxism attended to social relations (of exploitation) among classes at the expense of examining the relationship between society and nature.

The reconception of human-nature relationships involves questioning this conception of nature-as-external. In this paper I review recent work by particular geographers, illuminating the concept of nature each employs. I compare these to current theoretical work outside geography, particularly that of the American sociologist James O'Connor (and his associates) and of the Spanish ecological economist Juan Martinez-Alier. I ask whether political economy or human ecology can provide us with the conceptions and analytical strategies we need, or whether we must instead -- as Lakshman Yapa has suggested -- construct a theory of eco-political economy if we intend to be both critical and reconstructive.

NIMBY AND BEYOND: COMMUNITY INVOLVEMENT IN THE ENVIRONMENTAL REVIEW PROCESS FOR PROPOSED SOCIAL FACILITIES by M.M.Flad, Rudikoff & Rohde, Inc., Poughkeepsie NY 12601, and H.K.Flad, Vassar College, Poughkeepsie NY 12601.

The New York State Environmental Quality Review Act (SEQRA) has now been in effect for more than a decade. The application of the law was originally directed at the protection of the natural environment in the face of threat from development pressures. The strategies which evolved for confronting the impact of proposed highways, large housing tracts, and nuclear power plants have now metamorphosed into a methodology for opposing the establishment of facilities for the mentally retarded, drug treatment programs, and even nursing homes. This methodology has become known by the epithet "NIMBY" or Not In My Back Yard.

SEQRA was intended from the beginning to provide for the evaluation of social impacts, as well as impacts on the natural environment. It was not intended that the process would be used to prevent the development of a social infrastructure to provide for basic community needs. In the face of "NIMBY", the "standard operating procedure" has become that of "preemption" -- that is, seeking out a sympathetic state agency which will take responsibility for the environmental review process, even in the face of protest (or lawsuits) from local planning boards, citizens or municipalities.

A process of mediation needs to be developed as an alternative to this adversarial approach to decision-making. The establishment of what some see as "noxious social facilities" cannot be allowed to languish while the courts play out a process that was originally framed to deal with other concerns.

COMPACTNESS AND ELECTORAL BOUNDARY ADJUSTMENT IN BRITISH COLUMBIA, CANADA by M. Flaherty, Department of Geography, University of Victoria, British Columbia V8W 2Y2, and W. Crumplin, Department of Geography, Queen's University, Kingston, Ontario K7L 3N6.

Whenever electoral boundary adjustments are proposed, concern is often expressed over what criteria are appropriate for assessing whether they reflect partisan interests. Suggested criteria to date include equalizing riding populations, respecting natural boundaries, and protecting communities of interest. One other criterion that has been proposed is the degree of spatial compactness of electoral districts.

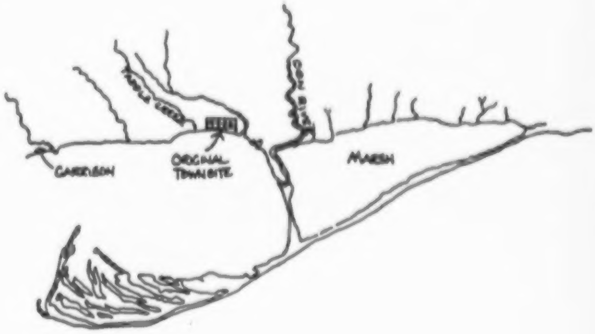
Several different measures of spatial compactness have been developed. To date, however, these methods have been subjected to little critical evaluation or empirical application. This paper assesses alternative compactness measures and applies conceptually appealing measures to the provincial ridings proposed by British Columbia's Royal Commission on Electoral Boundaries (1988). It then suggests a hierarchy of criteria that could be used to either develop or assess a proposed electoral redistribution.

ACCESS-BASED TRANSPORT ANALYSIS by G. Flay, Dept. of Geography, Univ. of Minnesota, Minneapolis, MN 55455

Current Third World transport planning project selection criteria are based on economic cost benefit analysis. This method compares the economic benefits of lower transport user costs to the economic costs of project construction and maintenance. However, post-project analyses of the past 30 years have shown that the economic impact of these projects is often weak, while their social impact is often strong. Access-based analysis focuses on the social value of transport, integrating both transport network development and social facility location. Using cost-benefit analysis as a model, access-based analysis defines benefits as improvements in accessibility measures rather than lower transport user costs. This allows the comparison of the access value of a new social facility, such as a school, against the access value of a transport project, such as a new road link. In addition, this technique generates an exhaustive list of possible access projects, and then heuristically searches for the set of projects which optimizes national access measures. The intended impact of this technique is the maximization of social opportunities and human resource development, and serves as a complement to economic resource development in directly productive sectors, such as agriculture and industry.

TRANSPLANT PRODUCTION COMPLEXES AND THE SPATIAL DIVISION OF LABOR By Richard Florida, School of Urban and Public Affairs, Carnegie Mellon University, Pittsburgh, PA 15213.

This paper explores the rise of Japanese foreign direct investment in the steel, rubber, automobile, assembly, and automotive parts industries in North America. This has led to the formation of integrated transplant production complexes predominantly in the industrial heartland. This paper details the geography of transplant production complexes, explores their links to Japanese advances in "post-fordist" production organization, and the role of tight linkages and obligational subcontracting in these complexes. It then examines the effect of transplant production complexes in the changing spatial division of labor in North America and internationally.



A DIALOGICAL LANDSCAPE OF THE CATALAN PYRENEES by Mireya Folch-Serra, Department of Geography, Queen's University. Kingston, Ontario K7L 3N6

The carnival sense of the world, wrote M.M. Bakhtin (1895-1975), conveys a pathos of shift and changes, of death and renewal. Carnival sums up rituals and diverse festivities that reflect popular culture. Bakhtin's theory of language encompasses as well other concepts such as dialogism, heteroglossia, the chronotope, and polyphony. Together, they lead to a better understanding of otherness and alterity. This understanding provides the basis for a conceptual landscape that indicates the moment and situation (time/space) of a dialogue whose outcome is never a neutral exchange. Landscape, thus, becomes not only "graphically visible" in space but also "narratively visible" in time through dialogue. I intend to critique, apply, and adapt several Bakhtinian notions to the geography of the Catalan Pyrenees where a social, peasant culture, is taking place. Like Bakhtin, my purpose is to unravel a worldview and a typology of culture embedded in the landscape, and manifested in the locales where social interaction occurs.

FIELD PATTERNS, SOIL LANDSCAPE PATTERNS, AND CONSERVATION RESERVE ELIGIBILITY IN TWO GEOMORPHIC REGIONS by J. H. Fonkert, University of Minnesota and Minnesota State Planning Agency, St. Paul, Mn. 55155.

The Conservation Reserve Program (CRP) pays farmers to remove highly erodible cropland from production for ten years. A field is eligible if it is at least two-thirds comprised of soils exceeding specified erosion standards. Implementation of the program depends on the ability of administrators to accurately estimate erosion and measure the areal extent of erodible soils.

Field eligibility depends on the interplay of local field patterns, the pattern of the soil landscape as mapped in soil surveys, and the details of the eligibility rules. I have examined these relationships in several geomorphic regions. The two case studies reported here illustrate the difficulty of designing nationally uniform rules in a world of geograpahic diversity.

In the deeply dissected, dendritic landscape of Ringgold County, Iowa, only very small fields or elongated fields following ridgetops or bottomlands fail to qualify. On the complex knob and swale terrain of Cerro Gordo County, Iowa, most fields that, at first glance appear good candidates for eligibility, do not qualify because of the way the rectangular field pattern overlays the soil maps.

TEACHING THE CONCEPT OF REGION by James W. Fonseca, Graduate School, George Mason University, Fairfax, Virginia 22030.

The concept of region can be taught as an evolving concept which has undergone changes as the intellectual paradigms of the discipline have shifted. S. C. Pepper, in his work World Hypotheses: A Study in Evidence (1970), has classified approaches to thought into three distinct categories which I have adapted to classify thinking about regions. Organicism was exemplified by Ratzel, Ritter and von Humboldt. In this mode of thought the region was viewed as a concrete and growing object. In mechanism the region is seen as a type of machine. This view carries over into modern field theory and systems models as seen in the work of S. B. Jones, J. Q. Stewart, and Warntz. Formism approaches the concept of region in the intellectual tradition of realism and platonic idealism. In this school of thought, the region is seen as a subset of logical classification. The work of D. Grigg and L. Zobler are examples. In contextualism, a region varies based on the perspective of the observer. The classic statement of the region in this context is that of D. Whittlesey in AGIP, 1954. Any given geographical area may yield an infinite set of regions based on the criteria selected and the purposes of the observer. Interactive geographic information systems represent the epitome of this perspective of region.

AN ASSESSMENT OF BATTLEFIELD MAP EFFECTIVENESS by Captain J. Fontanella, Department of Geography, United States Military Academy, West Point, New York 10996.

Battlefield map effectiveness was investigated in a perception experiment with three variables: method of symbol explanation, method of terrain representation, and military experience or interest. Maps of two hypothetical battles were used in the experiment and were preceded by either a "natural" legend or conventional legend. Subjects viewed one map of each battle; battles were alternately configured with different methods of terrain representation. Experience and interest was determined by questionnaire. Test responses were examined to determine the influence of each variable on map effectiveness. The results suggest that: (a) the "natural" legend promotes understanding of battlefield map symbols in certain map reading tasks and is at least as effective as the conventional legend in others; (b) the interpretive method of terrain representation facilitates performance of military terrain analysis tasks; and (c) military experience and interest facilitates performance in tasks requiring symbol identification or overall integration of map information.

THE IMPACT OF REGIONAL DEVELOPMENT ON THE SOVIET'S MILITARY POSTURE IN SIBERIA AND THE FAR EAST by Captain Sharon Fontanella, Instructor, Department of Geography, United States Military Academy, West Point, New York 10996.

This study assesses the Soviets' military capabilities in the Far Eastern Theater by analyzing the ongoing development of the region. The study is based on a hypothetical strategic-operational war plan for a Soviet invasion of China combined with an analysis of development. The level of regional development is determined by analyzing four resource categories: manpower and urbanization, energy and industry, transportation and communication, and agriculture.

Despite the extensive natural resources and the recent capital outlays for the development of Soviet Asia, the Soviets are currently incapable of waging a prolonged conventional war against China. The lack of a well developed infrastructure severely limits the theater's combat potential. However, the Far Eastern theater is more than a strategic defensive force since it is capable of waging a limited, short-term offensive operation.

CHANGING ORGANISATION OF RETAILER-SUPPLIER RELATIONSHIPS : LOCATIONAL AND EMPLOYMENT IMPLICATIONS BY J. Foord, Geography Department, Polytechnic of North London, Holloway Road, London, N. 7. ORN and S. R. Bowlby, Geography Department, University of Reading, Whiteknights, Reading, RG62AB.

Complex changes are currently taking place in the organisation and spatial structure of production. Debate on the nature of these changes seems to suggest the end of mass production as the dominant form of industrial organisation in the western world and the growth of specialised flexible forms of production for increasingly segmented markets. These new forms of production are both initiating and being generated by changes in inter-sectoral relationships; that is in relations between the manufacturing and service sectors.

This paper reports on the first results of an ESRC funded research project into the locational and employment implications of inter-sectoral change. It focuses on the impact of new linkages within the retailing - distribution - manufacturing chain. Shifts in the nature, location and division of employment between and within these sectors will be outlined. The paper will also draw examples from two specific product areas - food and clothing - which are under investigation in this on-going research.

U-SERIES OF THE DRAINING OF AN AQUIFER
FORD, Derek C. Department of Geography, McMaster University, Hamilton, Ontario, Canada, L8S 4K1.

Wind Cave, South Dakota is a three-dimensional, rectilinear maze cave developed in 120 m of bedded limestone and dolomite of Mississippian age overlain by thick sandstone and shale cover strata. 80 km of small, drained phreatic passages have been mapped beneath an area of 1.8 km^2. Exploration terminates at a watertable ("The Lakes") 140 m below the highest parts of the cave. The cave was excavated by thermal waters, possibly mixed with simple meteoric waters. Calcite crusts precipitated from the waters.

57 U-series measurements have been made on fragments of broken calcite wall crust and pool raft debris collected along the traverse between the cave entrance and the Lakes. They reveal that the lower cave has been draining as a backwater (as it is today) during the past 350,000 years. The water table fell at an irregular rate with temporary returns to higher levels. ^{234}U: ^{238}U ratios in the water have been remarkably constant, pointing to a deep, regional source. This constancy permits the regional uranium best estimate (RUBE) extrapolation method to extend the dating range; it appears that these conditions have been probably pertained for ~600,000 years.

Earlier, the water table stood higher and ^{234}U: ^{230}U ratios were variable. It is suggested that there was active discharge of thermal waters through the cave at this time, with a more significant admixture of meteoric waters to cause the U:U ratio to vary. A general model for the evolution of the cave will be presented.

MUNICIPAL LEVEL COMPREHENSIVE PLANNING UTILIZING A LAND INFORMATION SYSTEM by Jack J. Ford, Shippensburg University, Shippensburg, PA 17257.

Comprehensive planning at the local level demands an ongoing synthesis of land based data in order to become an effective planning tool. Land information system (LIS) methodology provides an effective research framework for a refined and continuous synthesis of land based data. The State of Pennsylvania mandates comprehensive plan development but not explicitly a LIS methodology. However, the State of Pennsylvania mandates consideration of all of the interrelationships that exist between components of a plan. LIS methodology provides a unique design for formulation interrelationships about land based data.

The study area is a 2.7 square mile municipality in south-central Pennsylvania. The digital data base consisted of roads, elevations, land use, sewer and water lines, bedrock and depth to water table. The study unit was approximately .3 acre with 110 rows by 160 columns which produced approximately 17,600 study units.

Comprehensive planning develops a strategy to allocate undeveloped land. In a similar manner LIS methodology permits a spatial partition of undeveloped land in order to more effectively regulate future development. Undeveloped land in the study area is successfully partitioned into areas based on distance to roads, public water and sewer and prime soil. A series of maps and graphs are developed which successfully define the spatial extent of undeveloped land in the municipality. Armed with this data a comprehensive land management plan is easily formulated and more importantly legally recognized by the judicial system.

DECONSTRUCTING THE STRIP by Larry R. Ford, San Diego State University, San Diego, California 92182

The American commercial strip is changing. No longer does the strip epitomize American individualism, architectural symbolism, economic opportunity, and spatial chaos to the degree that it did only a few years ago. The strip has been sanitized, organized, homogenized, and otherwise "improved" almost beyond recognition. My goal in this brief paper is to review interpretations of how and why the strip evolved in the first place and then to summarize and interpret its devolution over the past decade or so. It is my contention that all of this has something to do with deconstruction—theoretically, symbolically, and literally.

The recent acceptance of Modernism on the commercial strip begs for an explanation which involves both the assumption of linear, rational aesthetic change and the power relations between the strip and larger-scale developments downtown and in regional shopping centers. During the early years of the twentieth century, for example, downtowns were filled with towers, turrets, bright lights, and exotic signage while incipient strips tended to be plain and backward. As downtowns moved toward controlled, rational, "tasteful", Modern architecture and design, the strip became known for its colorful chaos and individualism. Since it was out-of-step with the architectural and planning elite, the strip was criticized heavily for its ugliness., Gradually, sign controls and other restrictions were developed.

Today, as the strip has been legislated into submission, downtowns have abandoned Modernism in favor of the exotic imagery of the strip. Once more the strip is obsolete, bland, and ugly.

TOPONYMIC GENERIC PLACE NAMES IN PRE-INDEPENDENCE BELIZE AND CULTURE HISTORY by Robert E. Ford, Department of Geography, Brigham Young University, 690 SWKT, Provo, Utah 84602

A total of 941 toponymic generic place names of Belize are analyzed in terms of historical-cultural development; a key focus is demonstration of human-environment interaction in the place-naming process. Several patterns of naming are shown: borrowing, creation of new names, redefining old names.

A hierarchical classification system is proposed which demonstrates that "physical" generic terms predominate (77%) over "cultural" ones (23%). Among the physical terms "landform" generic names (92%) far outweigh "vegetation" ones (8%), and "fluvial" terms (91%).

The names demonstrate the dominant influence of extractive livelihood patterns in Belize's history, and its location on the Rimland-Mainland frontier, as defined by West and Augelli, is also very clear. Some unusual "created" terms like Haulover, Cay, and Stand are discussed in more detail.

Toponymic names in Belize illustrate the process of sequent occupance, and cultural-ecological adaptation to a tropical region by a diversity of immigrants originating from extratropical areas (some of the groups involved include: Amerindians, Garifuna, East Indians, English, Scot, Black/Creole, Chinese, Middle Eastern peoples, Spanish/Mestizo, Mennonite, and others).

NATURAL CHANGE AND NET MIGRATION IN THE GROWTH OF INDIVIDUAL METROPOLITAN AREAS: 1950-1988, by Richard L. Forstall, Population Division, U. S. Bureau of the Census, Washington, D. C. 20233

Most U. S. metroploitan areas have more births than deaths and therefore would grow slowly failing any migration in or out of their territory. High rates of population growth or actual population declines, the extremes of population change, result from strong currents of net migration, reinforcing or counteracting the effects of local birth and death rates. Individual metropolitan areas vary widely in the relative impact of natural increase and net migration on their total population change. Patterns also have changed over time; many metropolitan areas that had substantial growth based on net inmigration in the 1950s subsequently have experienced a net migratory outflow, resulting in much lower overall growth or actual population decline. However, since 1980 a number of areas have experienced net inmigration.

The paper reviews the natural increase / net migration patterns of individual metropolitan areas and regional groups over the period from 1950 to 1988, with some data for the 1940s. Particular attention is given to the regional distribution of two groups of metropolitan areas, those with long-term gain from net migration and those woth long-term outmigration. The contribution of territorial expansion to metropolitan growth also is summarized.

AN ANALYSIS OF THE LOCATIONAL DYNAMICS OF PHYSICIAN SUPPLY by Stuart A. Foster, Department of Geography and Geology, Western Kentucky University, Bowling Green, Kentucky 42101.

The supply of physician manpower in the United States has increased dramatically from a perceived shortage to a perceived surplus. At issue is the extent to which there has been an accompanying diffusion of physician supply from physician-rich areas into physician-poor ones. This paper examines the locational dynamics of physician supply in a selected sub-national region. The expansion method paradigm provides the framework for analysis. A spatially smoothed regression model, based on spatially interacting observational units, constitutes the initial model. The expansion method is employed with this model to disaggregate the macro-scale locational dynamics into context-specific, micro-scale components. The result is a context-sensitive representation of the diffusion process.

BUSINESS STRUCTURE AND HIGHWAY ACCESSIBILITY AS MEASURED BY "ES202" DATA FOR WISCONSIN SMALL TOWNS by Brady Foust, UW-Eau Claire, Eau Claire, WI 54701 and Howard Botts, UW-Whitewater, Whitewater, WI 53190.

Central place theory suggests that variations in accessibility should affect the economic structure of places as measured by the number, sizes, and kinds of business activities. This premise is explored in this paper through a comparison of the business structure of "isolated" small towns in Wisconsin to those directly on limited access (mostly Interstate) highways.

In the past, such comparisons required extensive and time-consuming field surveys. Today, however, data collected in ES202 tapes as part of Federal Workman's Compensation requirements provide a current, consistent, and accurate picture of the business structure of small towns. In Wisconsin, these data are available at the municipal (incorporated place) level for 4-digit SIC's.

We derived the business structure at the 3-digit SIC level for all incorporated places in Wisconsin with a population between 1,000 and 5,000 persons. Cluster analysis was then used to determine whether or not the data set could be divided into "isolated" and "Interstate" central places. The final result of our preliminary analysis is that the differences between the two groups of towns are much less than might be expected.

PROGLACIAL LAKE MODIFICATION OF THE NEW YORK DRUMLIN FIELD by Mark A. Francek, Department of Geography, Central Michigan University, Mt. Pleasant, MI 48858

Glacial Lake Iroquois, a large proglacial lake that occupied the Ontario Basin, significantly modified the New York drumlin field. The efficacy of lacustrine modification is based on drumlin location relative to the Iroquois swash zone. Five drumlin groups with increasing base elevations reflect varying degrees of modification: (1) The "submerged" group-lacustrine deposition produced poor drumlin streamlining and low relief. (2) The "wave-planed" group-flattened summits occur where drumlins rise into swash zone. (3) The "erosion" group-wave erosion resulted in low drumlin densities. (4) The "notch" group-partial inundation resulted in wave-cut notches. (5) The "unmodified" group-protection from wave erosion allowed for high drumlin densities. These modifications are superimposed upon spatial patterns attributable to ice and subsurface conditions. Variations in drumlin streamlining relate to the speed and thickness of ice. Ice retardation due to the Onondaga Escarpment contribute to increased drumlin densities.

CONCEPTUAL MODELING FOR GEOGRAPHIC DATABASES by Andrew U. Frank, Department of Surveying Engineering/NCGIA, University of Maine, . Orono, ME 04469.

A geographic database contains a model of a subset of the real world. Conceptual modeling deals with the methods used for constructing such models, the formalizing necessary and the tools available. It is not concerned with the selection of data structures and algorithms used for the implementation of a GIS.

Structuring methods for data models (eg. the relational data model) provide for the analysis of the data and provide a language for its description. Database research and artificial intelligence have studied methods for classification, generalization and aggregation. We will explain a set of modeling tools for attribute data as we found them useful. Some examples of descriptions in a graphical format are shown. In the GIS field we also need geometric data models (eg. raster or vector-based models).

The geometric data models need a more rigorous formalization. GIS further needs inclusion of time in its data modeling tools, and we must be able to describe situations where multiple representations of the same objects are appropriate. These are areas where findings from database research can be applied and suitably extended.

THE PLACENESS OF HOUSEHOLD RECYCLING IN THREE BROOME COUNT COMMUNITIES by John W. Frazier, Department of Geography, SUNY Binghamton, Binghamton, New York 13901.

There is a growing body of research that illustrates the complexity of the decision to recycle at the household level. This paper offers a model of this decision process. Conceptually, places reflect a special combination of human and physical attributes. One example is the taxonomy of old urban center, suburb and rural community. While there are certainly variations in types of centers (urban) and suburbs, there are sharp differences between these two classes. The most obvious include economic, racial and age distinctions. There may be other differences, as well - some being related to demographics others to information channels that influence individual attitudes and behaviors.

On a practical level, these are important considerations for communities which must plan voluntary recycling program.s There are also import theoretical issues involved in such assertions. This paper reports the results of a discriminant analysis of three Broome County, New York places: Endicott (small, old urban center), Vestal (an established, wealthy suburb) and Chenango (a rural village). The model includes actual and intended recycling behavior, community attributes, communication channels and preferences related to recycling, and mitigating factors associated with participation in a demonstration recycling program.

POST-COLONIAL LANDSCAPE MODIFICATION IN THE NORTHERN BAJIO (GUANAJUATO), MEXICO by C. Frederick, T. Hickson and J. Kimmel, Dept. of Geography, University of Texas at Austin, Austin, Texas 78712-1098.

The hydraulic landscape initiated by the Spanish in the Bajio during the 16th and 17th centuries has resulted in dynamic adjustments of the landscape and the fluvial system. This paper focuses on the landscape changes associated with ex-Hacienda Puerto Nieto, east of San Miguel de Allende, Guanajuato. Field reconnaissance and mapping of cultural and fluvial features together with archival information concerning landuse are used to illustrate a dynamic shift in the landscape associated with post-Colonial settlement in this region.

Hydraulic structures (5 dams) and landuse changes associated with implementation and maintenance of the Spanish agrosystem, combined with more recent structures (a highway bridge and road grade) have initiated a shift in both landscape hydrology and fluvial process. Record of this shift is found in the pre-Spanish valley axis deposits and in the Colonial age historic sediments captured behind the dams. None of the dams are presently functional. Subsequent to their failure, alluvial fans began to form and prograde immediately downstream of two of the structures, located south and west of Puerto Nieto. Analysis of one fan situated adjacent to the town of Santas Marias indicates aggradation in excess of 3.0 m below the dam and progradation of more than 1 km in less than 300 yrs. Active progradation of the fan presently results in the occasional degradation of crops by the deposition of gravel sieve deposits near the distal end of the system but also promotes a less fertile, better drained and more easily worked soil which is favored by the local farmers.

PLEISTOCENE PRAIRIES IN THE CENTRAL GREAT PLAINS OF NORTH AMERICA: PALYNOLOGICAL EVIDENCE by G. G. Fredlund, Department of Geography, University of Kansas, Lawrence, KS 66045

Fire ignition by humans has long been hypothesized as essential in the maintenance of grasslands in the Great Plains. Palynological evidence from a number late-Pleistocene sites in the central Great Plains indicates that regional vegetation was primarily open parklands to true grasslands for at least 35,000 years prior to the documented presence of humans on the North American continent. Lightning ignited fires and megafauna herbivory are hypothesized to be the sources of disturbance responsible for the maintenance of these pre-human grasslands and parklands.

The evidence for Mid-Wisconsinan (45,000 to 20,000 BP) grasslands comes primarily from a 37-meter-long core taken from the Cheyenne Bottoms marsh in central Kansas. Pollen assemblages from these openwater lacustrine sediments are dominated by Poaceae, and other NAP types. Percentages of arboreal pollen types suggest that more woodlands were present on fire-protected sites than at the time of settlement. The Cheyenne Bottoms record is corroborated by a number of lesser sites scattered from the Sand Hills of Nebraska to southeastern Kansas.

The evidence for Late-Wisconsinan (20,000 to 12,000 BP) is less consistent. Sediments from this period are missing from the Cheyenne Bottoms record, suggesting a period of aridity. Other sites scattered over the region document Picea along major rivers and suggest open aspen parklands covering the uplands during this period.

THE DISMANTLING OF U.S. ARMY FORTS ON THE NORTHERN GREAT PLAINS, 1866-1891 by Gary S. Freedom, McNeese State University, Lake Charles, Louisiana 70609.

Between 1866 and 1891 the U.S. War Department organized the present-day states of Montana and the Dakotas into the military department of Dakota. Within this area, which stretched from the foothills of the Rockies to the Red River and from the Canadian border to the Platte River, the Army built, garrisoned, and maintained 31 military forts. These forts, however, were not all contemporaneous, for as new posts were established, older forts were decommissioned. This duality of new construction and dismantling continued until 1881; thereafter, no new forts were built, but the dismantling continued.

This research has two primary goals. The first is to portray in cartographic, photographic, and tabular formats the advance and retreat of the fort network. The second is to describe and account for the process of fort abandonment on the Northern Great Plains. Census data, U.S. government papers, newspapers, and other primary sources document these processes. Results show that multiple factors were involved in the decision to maintain or abandon an individual military fort. These factors include the advance of white settlements and the subsequent retreat of Indian-dominated areas, improvements in transportation and communications, the state of local economies, and the power of elected officials and other pressure groups.

STATUS OF GIS UTILIZATION BY ELECTRIC UTILITIES FOR MARKET RESEARCH, by Luisa M. Freeman, Freeman Research Resources, 162 1/2 E 71st Street, New York, NY 10021.

This paper discusses the use of Geographic Information Systems and geodemographic databases by electric utilities for market research and marketing. There is growing interest in not only knowing what it is that electric customers want, but where they live and operate their businesses and how these spatial patterns can affect the development and provision of utility services. Utility companies have now embraced personal computers and have the capability to perform demographic and "firmographic" analysis with greater speed to aid management decision-making in an increasingly competitive market environment. The recent discovery of geocoding and GIS tools by the electric industry is further advancing this market research revolution.

The author will discuss a project funded by the Edison Electric Institute, the marketing and lobbying association for the electric utility industry, to develop a primer on the use of GIS as a market research/marketing tool for the industry. The project included a national survey of EEI members to assess the level of awareness, use and interest in GIS for this purpose.

FLOODPLAIN DEVELOPMENT THROUGH VERTICAL ACCRETION: LONG TOM RIVER, WESTERN OREGON by Dorothy E. Freidel, University of Oregon, Eugene, Oregon 97403.

Holocene stratigraphy of the Long Tom floodplain, at the transition zone between the Coast Range and the Willamette Valley, was studied in backhoe trenches and auger holes. Drainage area is about 151km^2, and the river has a narrow, deep, sinuous, suspended load channel. The floodplain has a "layer cake" stratigraphy consisting of a 3m thickness of vertical accretion deposits. Based on sediment stratigraphy, buried paleosols, and dated buried archaeological remains, five episodes of vertical accretion have been identified: prior to 9800 years ago; 9500 to 9100 years ago, with deposition continuing in some areas until 7700 years ago; 4400 to 3900 years ago; before 2100 years ago until 1100 years ago; and about 500 years ago until present. Intervening periods were dominated by floodplain stability and soil development. Two possible periods of erosion have been identified: between 7700 and 4400 years ago, and 3900 to 2100 years ago. For the last 10,000 years, floodplain development has been dominated by vertical accretion, and the zone of lateral migration has been very narrow, in contrast to other rivers of the region.

THE MISSOURI RIVER: THE MISSISSIPPI'S LIFE BLOOD by Brian P. Freidhoff, United States Corps of Cadets, United States Military Academy, West Point, New York 10996.

During the summer of 1989 I conducted research at the Waterways Experiment Station in Vicksburg, Mississippi. Using information from Corps of Engineers and Coast Guard documents, personal interviews, newspaper articles, news footage, and reports from committees including the President's Inter-agency Drought Policy Committee I examined the 1988 drought and its effects on the Mississippi River System.

In my research I addressed the economic impact of the drought on the barge and towing industries, the role of the river industry task force, and problems which developed as a result of low water levels. Two prominent problems were salt water intrusion and shoals. The main scope of my research, however, was to determine what contributions were made to the Mississippi River by its tributaries, with a focus on the Missouri River.

My investigation demonstrated that the Mississippi River could not have remained navigable during the crisis period without waters supplied by the Missouri River system. Significantly, at the height of the drought, the Missouri was contributing 60% of the Mississippi's water flow. The Missouri's waters, together with contributions from other tributaries and bottom dredging operations, allowed the Mississippi to remain navigable throughout the drought.

RESPONSE OF SALT MARSH VEGETATION TO ALTERED TIDAL REGIME by Robert E. Frenkel and Janet C. Morlan, Department of Geosciences, Oregon State University, Corvallis, Oregon 97331.

Salt marsh vegetation is dynamically controlled by tidal circulation leading to distinctive microtopography, floristic composition, zonation, and physical and ecological processes. In 1961, a 22 ha natural salt marsh in the Salmon River estuary, Oregon was removed from tidal circulation by diking and converted to semi-natural pasture. Dikes were breached in 1978 and tidal circulation returned. We evaluate vegetation response to altered tidal regime 10 years after reimposed tidal inundation. Repeated sampling at 105 permanent plots along 20 transects and sampling of 49 creek cross sections permit ecological assessment.

Under diking, creeks and drainage diminished, marsh surface subsided, sedimentation lessened, salinity and flooding decreased, species composition changed, diversity increased, vegetation zonation became obscure, and patchiness increased. Under reimposed tidal circulation, these trends were reversed. Of the above biophysical attributes, vegetation was most sensitive to altered tidal regime because salinity and flooding were abruptly changed by dike imposition and removal. As creeks deepen and drainage increases and tide-driven processes slowly change, vegetation will continue to change, but slowly.

A STUDY OF SPOKEN AND WRITTEN DRIVING DIRECTIONS. Scott M. Freundschuh and David M. Mark, National Center for Geographic Information and Analysis, Department of Geography, State University of New York at Buffalo, Buffalo, New York 14260.

In a prior experiment, adult subjects were approached in one of two shopping malls in the Buffalo area, and asked for directions to the other mall. These conversations were tape-recorded without the subjects' knowledge and later transcribed. These directions were analyzed for 1) kinds and numbers of landmarks used, 2) length of conversation, 3) distance information, 4) errors, and 5) gender differences. A second study was conducted for the purpose of gathering written directions between the two malls, and then comparing written and spoken directions. In this study, adult subjects from the SUNY at Buffalo campus were asked to give written directions from one of the two malls to the other. Preliminary results indicate several differences between written and spoken driving directions. Many of the spoken directions contained a common spatial orientation (i.e., starting point), whereas none of the written directions did. In addition, spoken directions, in most cases, were descriptions of the route, as if the giver of the directions was making the trip in his/her mind, and then describing the route as the interviewer would see it when he/she made the trip. Contrary to this, the written directions were not descriptive, but instead were imperative (i.e., turn left onto Maple) Several of the spoken directions contained errors, whereas, none of the written directions did. Preliminary results also indicate common gender differences within spoken and written directions. Directions given by female subjects (both spoken and written) contained significantly more landmarks than did directions given by male subjects. Directions given by male subjects (both spoken and written) contained significantly more cardinal directions, as well as distance information, than did directions given by female subjects.

METROPOLITAN AND CENTRAL CITY POPULATION CHANGE: BEYOND THE TRANSITION, by William H. Frey, Population Studies Center, University of Michigan, Ann Arbor, MI 48104-2590.

The l970s has been called a "transition decade" in the history of U.S. population redistribution because of the sharp reversals that occurred across regions, metropolitan areas, and central cities. Northern metropolises registered unprecedented population losses. South and West small and nonmetropolitan areas exhibited gains, and the strong suburbanization of the l950s and l960s took on new forms.

Three types of explanations were proposed to account for these reversals. "Period explanations" attributed them to economic and demographic conditions that were unique to the decade. "Deconcentration explanations" saw them as the beginning of a long-term population dispersal."Restructuring explanations" interpreted them as a spatial representation of world-wide economic shifts that will lead to new urban and regional growth configurations.

The present paper employs post-1980 census population estimates and Current Population Survey data to contrast redistribution patterns of the l980s with those of the "transition decade." These comparisons permit us to evaluate each explanation for the l970s-decade reversals.

THE SUPERMARKET SETTING IN THE GEOGRAPHY OF EVERYDAY LIFE by Justin C. Friberg, Old Dominion University, Norfolk, Virginia 23529-0088.

The geographies we hear about, read about, and teach about are generally presented at conventional global, continental, national, or macro-regional scales. We are less often exposed to the explanation of settings at the micro-geographic scale, especially at individual levels or local, vernacular scales.

The supermarket is a common feature in our everyday lives. While familiar with this setting, most of us are not aware of the degree to which this industry employs spatial considerations and strategies to influence consumer behavior. This slide-illustrated presentation deciphers the supermarket setting in terms of geographic concepts and perspective. Using the five themes of geography (location, place, human-environmental interactions, movement and region) the horizontal and vertical applications of spatial design, the distribution and associations of merchandise and the movements of customers are examined.

ANALYSIS OF THE IMPACTS OF OFF-ROAD VEHICLE USE IN HUNGRY VALLEY CALIFORNIA STATE VEHICULAR RECREATION AREA by D. Fridell, Department of Geography, San Diego State University, San Diego, CA 92182, B. Fredrich, Dept. of Geography, SDSU, San Diego, CA 92182, and R. Wright, Dept. of Geography, SDSU, San Diego, CA 92182.

Off-road vehicle use has created a visually prominent landscape pattern in many areas of the southwestern United States. A system of parks has been established in California dedicated specifically for use by ORVs. An acknowledged goal of ORV user groups and park managers alike is the development of a monitoring system to aid in the preservation and restoration of environmental quality in order to sustain future use.

This paper documents the historical changes and impacts associated with off-road vehicle use within a state-designated recreation area. Using five representative sets of aerial photography spanning temporally from 1940 to 1988, changes in land use, vegetation associations, and trail expansion was mapped and then analyzed using a geographic information system to quantify the rate and character of change associated with this recreational use. Additionally, an evaluation of SPOT panchromatic imagery was made to determine its utility as a monitoring mechanism of impacts.

GENDER AND URBAN TRANSFORMATION: ORGANIZING NEIGHBORHOOD WOMEN by Susana T. Fried. Departments of Urban Planning and Political Science, Rutgers University, New Brunswick, N.J. 08903.

This paper will explore several themes related to the possibilities of neighborhood organizing around gender and class. First, the constraints of economic conditions and the policy environment will be analyzed with regard to specific organizing strategies and options. Second, the redefinition of "economic development" or "community development" as a result of gender and class grassroots mobilization will be assessed, along with the expansion of the meaning of politics or political activism that results. Finally, the policy impact of these efforts, or the conditions under which neighborhood organizing is enhanced or deterred will be a central consideration. Three general theoretical questions are of particular interest. First, what are the conditions under which neighborhood organizing is more or less effective? Second, does gender and class sensitive organizing change the potential policy impact? Third, what are the broader implications of gender and class sensitive organizing around neighborhood issues for understanding the process of urban development and social change?

COMMODITY FLOWS AND SPATIAL STRUCTURE by J. Lynne Friedmeyer, Department of Geography, Indiana University, Bloomington, IN 47405

This study weaves together the research of Black and Fotheringham in an examination of spatial structure when applied to commodity flows. The objective herein is to gain a better understanding of the reaction of distance decay parameters in spatial interaction models of commodity flows to the spatial structure of supply and demand through empirical study. This involves a comparison of the influence of accessibility variables on distance decay parameters calibrated in production constrained and production constrained competing destinations models. The production constrained competing destinations model is more accurate than the production constrained model. The competing destinations model also produces more negative distance decay exponents. In both models, the effect of accessibility of destinations on the distance decay parameters is insignificant while the effect of accessibility of origins on the distance decay parameters is significant. Thus, there appears to be a need for a generalized model of spatial flows that incorporates spatial structure.

THE RELATIONSHIP OF ELDERLY CONCENTRATIONS, TRANSFER PAYMENTS, AND LOCAL ECONOMIC BASE IN NONMETRO ILLINOIS by Christopher A. Friel, Western Illinois University, Macomb, Illinois 61455.

There is a paucity of research on the local economic implications of elderly concentrations. Elderly concentrations that have emerged because of out-migration of the young (aging-in-place), may have very different socio-economic characteristics than areas which have experienced an in-migration of the old (retirement destination). State and local policymakers need to delineate these areas to formulate appropriate policy for the elderly. The Lt. Governor of Illinois, recently announced "the development of retirement communities as a key community development strategy," however, he only recognized three retirement destination counties. The purpose of this study is to delineate "elderly regions" in nonmetro Illinois by characterizing them as aging-in-place or retirement destination areas based on their current socio-economic conditions. Examining conditions in areas with a relatively high concentration of the elderly will help formulate more specific community development policies.

Socio-economic, demographic, and transfer payment data compiled at the five-digit Zip code level were analyzed using cartographic and statistical methods for an investigation of elderly concentrations and their role in the local economies of nonmetro Illinois. Findings suggest there are distinguishable socio-economic differences among elderly concentrations in Illinois. Using the five-digit Zip code as a unit of analysis revealed that the impact of aging-in-place and retirement destination processes will be felt at the local level, suggesting policy makers need to adopt an expanded definition of "retirement communities."

Isarithmic and Transect Map Point Value Estimation by Daniel E. Frye, University of Wisconsin -- Stevens Point, Stevens Point, Wisconsin 54481.

When mapping continuous data, a cartographer can choose between two popular forms of symbolization, the isarithmic map and the three-dimensional transect map. Past research and cartographic convention has suggested that if the map is to be used for point value estimation, the isarithmic map is the better symbolization. However, poorly designed or non-existent legends on transect maps may cause the errors that readers make.

Therefore, under the hypothesis that there is no significant difference between an isarithmic map and a transect map with a properly designed legend, a test was given to 32 subjects. Each subject was given two maps created on the Surface II graphics system, one isarithmic and one transect. They were asked to estimate the value of each of ten points on the maps. It was found that the subjects estimated closer on the isarithmic maps while the subjects over-estimated on the transect maps.

Also, the subjects were able to estimate closer to the actual value when the point was spatially closer to the legend as well as numerically closer to an anchor stimulus in the legend

---

GEOGRAPHIC ANALYSIS OF INTERSTATE COLLEGE STUDENT MIGRATION TO PUBLIC FOUR YEAR INSTITUTIONS OF HIGHER EDUCATION by James F. Fryman, University of Northern Iowa, Cedar Falls, Iowa 50614-0406.

This presentation examines the question, "What institutional characteristics are associated with interstate migration of college students to public institutions of higher education?" Two dependent variables were used as measures of interstate migration; the percentage of students classed as non-residents and the number of states represented in the student body. Fifteen independent variables were examined to determine degree of relationship with student migration fields and level of non-resident for each institution. Correlation analysis and step-wise regression were used to determine strength of association between variables and for modeling college student migration to public institutions of higher education. The entire population of four year public colleges and universities were used in the study. Prediction of both the level of non-residency and the diversity of non-residents was facilitated by institutional characteristics including measures of institutional size, age of institution, faculty characteristics and student characteristics. Several institutional characteristics were strongly correlated with the two independent variables.

THE CONTRIBUTION OF MIGRATION AND NATURAL INCREASE TO THE NONMETROPOLITAN TURNAROUND AND ITS REVERSAL by Glenn V. Fuguitt, Department of Rural Sociology, University of Wisconsin-Madison, Madison, WI 53706 and Calvin L. Beale, ARED, ERS, U. S. Department of Agriculture, Washington, D. C. 20005

Much has been written about population change and migration in connection with metropolitan-nonmetropolitan growth differentials, which have undergone two unexpected transitions in the past 30 years. Yet surprisingly little attention has been given to the contribution of natural increase along with migration in affecting metropolitan-nonmetropolitan population redistribution. Although birth and death rates have been converging, metro-nonmetro differences remain, and age structure differences also affect crude natural increase rates. Throughout this period, changes in fertility, mortality and age structure all have contributed to changes in natural increase, and hence to population redistribution, and all three are influenced by prior migration trends.

The purpose of this paper is to examine the trends in natural increase and net migration as they contribute to population changes in metropolitan and nonmetropolitan areas between 1960 and 1988. Time periods we consider would be 1960-70, prior to the major part of the turnaround, and then six periods of two to four years each between 1970 and 1988. These small intervals should enable us to trace trends from the turnaround through the post-turnaround era, and look for possible interrelations between fertility, mortality and migration.

POPULATION AGE STRUCTURE CHANGE IN EAST ASIA by Gary Fuller, Department of Geography, University of Hawaii, Honolulu, Hawaii 96822

Population projections reveal that the age structures of several countries in the East Asia region are now undergoing a rapid transformation. While countries like South Korea and China currently feature structures heavily laden with young adults, fertility decline will cause these age structures to resemble those of Europe within the next ten to twenty years.

The economic growth of the newly-industrialized East Asian countries has depended to a considerable extent on the availability of a large (and cheap) labor supply; Japan, too, has benefitted from the bulge of young adults in the region's population. As this supply dries up, new economic strategies will have to be developed.

Ironically, rapid population growth has heretofore been seen as a threat to economic development, and family planning programs have been heavily supported. Student protest movements in both South Korea and China have occurred as the young adult cohorts reached their largest-ever size. Thus, policy favoring low fertility is unlikely to change even though demographic trends now suggest a threat to the industrial competitiveness of the region.

MAPPING URBAN EXPANSION IN A HIGH DENSITY URBAN AREA WITH DIGITAL REMOTELY SENSED DATA: A CASE STUDY OF HONG KONG by T. Fung, Department of Geography, Chinese University of Hong Kong, Shatin, NT, Hong Kong.

Hong Kong is a densely populated and dynamic city experiencing tremendous economic growth and development. There has been an acute demand of space for urban development resulting in active reclamation of land from sea, construction of new towns and continuous urban redevelopment. To monitor the rapid expansion of the city, remotely sensed data provide a valuable tool. The purpose of this study is to use Landsat MSS and SPOT HRV multispectral data to map the extent of urban development of Hong Kong from 1972 to 1987. The data are radiometrically calibrated to reflectance values and geometrically registered. Change detection technique of image overlay is used to visually interpret the land use changes. A principal components analysis is applied to yield change vectors. The change vectors are thresholded iteratively to separate areas of change from the non-change areas. Post-classification comparison is then applied to the change areas to identify the specific types of change in Hong Kong. Preliminary results indicate that major land development can be easily detected and mapped.

PLACE INEQUALITY IN RURAL NORTH CAROLINA by Owen J. Furuseth, University of North Carolina at Charlotte, Charlotte, North Carolina 28223

While some rural counties in North Carolina remain among the most socio-economically disadvantaged in the United States, other rural counties rank among the most prosperous communities in the state. Using the rural-urban continuum typology as an organizational framework, this paper examines the impact of "rural-ness" and locational criteria on place inequality. Social, economic, and land tenure data employed to measure inequality. Finally, the impact of inequality on community development opportunities and options is examined.

SETTLEMENT REGRESSION AND MALARIA: THE CASE OF MIZQUE, BOLIVIA by Daniel W. Gade, The University of Vermont, Burlington, Vermont 05405

The effects of endemic and epidemic malaria on demographic contraction, land abandonment and regional impoverishment form one of the little known chapters of post-Conquest settlement in warm Andean valleys of Western South America. A noteworthy case study derived from archival documents is that of Mizque, a valley 2,000 meters above sea level in the Department of Cochabamba, Bolivia. Fertile soils, abundant water and a transitional climate in which a variety of tropical and temperate crops grow attracted Spaniards to settle there as early as the 1550s. In 1603 the Spanish crown chartered the Villa de Salinas del Rio Pisuerga, also known as Mizque, as one of the less than ten urban foundations in Alto Perú (Bolivia). This outpost of Iberian civilization, whose economic prosperity came from supplying grains, wine, livestock and wood to the silver city of Potosí, acquired an urban character with a range of institutions.

But beginning in the seventeenth century the installation of irrigation works expanded breeding sites for anopheline mosquitoes. Recurrent malaria epidemics raged through the valley. Population declined through mortality and out-migration. Scarcity and unhealthiness of labor precipitated a fall in economic activity. For more than two centuries, perennial malaria in this valley and its main town turned a rich zone into an impoverished backwater and aborted an emerging key node in the Bolivian network of cities. Beginning in the 1930s, understanding malaria causation brought drainage and spraying programs to keep the vector under control.

DEALING WITH DISPARITIES IN REGIONAL DEVELOPMENT: THE INTERMEDIATE ECONOMIC DEVELOPMENT REGION by Ole Gade. Department of Geography and Planning, Appalachian State University, Boone, NC 28608.

Traditional regional research and regional development planning theory and application has been embedded in the dichotomy of center-periphery perspectives. Utilising examples from China, North American and Scandinavia this study finds 1. that economic development tends to proceed along a spatially defined continuum; 2. that most central government efforts at relieving economic development problems of marginal regions falls far short of objectives; and 3. that these conditions are pervasive regardless of national differences in levels of economic development. The study proceeds to identify the existence and relevance of the 'intermediate economic development region' (IEDR). This region, of varying geographic dimensions, may be shown to function as a funnel through which modernisation and economic growth may be more effectively diffused to the peripheral and marginally developed region.

CITIES THAT HUSTLE: ENTREPRENEURSHIP IN U.S. LOCAL GOVERNMENT by Gary L. Gaile and Susan E. Clarke, University of Colorado, Boulder, Colorado 80309.

Cities in the United States are adapting by necessity to changing economic prospects. Until recently, local officials had three policy options regarding economic development: rely on general economic growth to sustain local revenue needs, utilize national and state economic development subsidies, or rely on local taxing authority, regulatory powers, and direct expenditures to encourage economic activities. Now a combination of regional economic shifts and urban policy reorientation at the federal level renders these first two options increasingly problematic. Local officials are adapting to these changes in policy context by crafting new strategies, using local funds and resources to generate local development activities.

This paper reports the results of a nationwide study of urban innovations to support economic development. These entrepreneurial management efforts vary by region and by development characteristics. A combination of quantitative and qualitative analyses, including case studies are used to explicate the dynamic processes that are evolving.

CANADIAN ENVIRONMENTAL MANAGEMENT AND THE FREE TRADE AGREEMENT by Robert J.P. Gale, Department of Geography, University of Toronto, Toronto, Ontario M5S 1A1

During the course of the negotiations for a Free Trade Agreement between Canada and the United States, public concern over the control of Canadian environmental management practices became a major issue. In response to this concern, the Canadian Trade Negotiations Office argued that the FTA represented a commercial accord between two trading partners and that environmental matters were not, therefore, a subject for negotiation. This view contrasted sharply with the observations of environmentalists that the FTA would have direct and indirect implications for environmental protection and management in Canada.

This paper examines the environment-free trade debate within Canada, the rationalization of environmental neglect at the TNO, and the environmental implications of this neglect for future environmental management practices in Canada. The paper concludes with suggestions as to how commercial accords can better integrate environmental considerations into economic development plans.

U.S. FLOODPLAIN MANAGEMENT: A COMPLEX, COOPERATIVE VENTURE by G.E. Galloway, Department of Geography, U.S. Military Academy, West Point, New York 10996-1695.

Since 1936, Federal, state and local officials have worked together in an attempt to alleviate national flooding problems and to develop a comprehensive approach to management of the floodplain. In a program that initially focused on structural response to flooding by Federal agencies, the emphasis shifted over time to non-structural approaches, the responsibility for which was shared by Federal, state and local governments using a wide variety of programs. Unfortunately, as the number of groups involved grew and the variety of programs increased, the complexity of coordination and the potential for inefficiency also rose.

This paper reviews the history of U.S. floodplain management with an analysis of the growth of organizations, legislation, regulations and philosophical approaches to wise use of the nation's floodplains. The paper concludes that while U.S. floodplain management programs have produced significant benefits for the country, the great complexity of these programs and their administration have prevented them from achieving complete success.

COASTAL DUNE SLOPE PROCESSES IN COLD CONDITIONS by James S. Gardner, and Jane Law, University of Waterloo, Waterloo, Ontario, Canada, N2L 3G1

Budget studies on dune slopes at Sandbanks Provincial Park, Lake Ontario suggest that mass transfer of sediment is significant during and immediately following periods when ground ice is present. Generally it has been assumed that dune slopes are immobilized during period of seasonal ground frost and snowcover. The results of two years monitoring of dune slopes at Sandbanks Park are presented in this paper. The data indicate that the dune slopes assume the natural repose gradient for the materials only during a few months in the summer and early fall. During this period stabilisation is enhanced by seasonal vegetation. An intermittent and wind-scoured winter snow-cover does not provide protection to the dune slopes. Rather mixed deposits of snow and sediment lead to significant mass transfer on melting of the snow. The presence of seasonal ground ice enhances sheet wash and rilling during rain and melt events as well as mass transfer by gelifluction, slurries, and surficial slump-like slope failures. The morphologies produced by these processes are subsequently masked by "normal" eolian mass transfer processes.

PREDITCTING EROSION ALONG THE EAST COAST OF THE UNITED STATES by Paul A. Gares, Colgate University, Hamilton, New York, 13346

Dunes are an important component of the system because they prevent flooding of inland areas during raised water levels associated with coastal storms and they represent stored sediment which is available to replenish sediment removed from the beach during storms. The ability of existing dunes to fulfill these functions forms the basis for evaluating the vulnerability of a given coastal locality to coastal storms.

This paper focuses on erosion hazard. A methodology for predicting a locality 's vulnerability to erosion is presented. The technique relies on information provided by Hallermeier (1987) which relates the volume of dune loss to storm size, expressed as a recurrence interval. This relationship is applied to seven beach/dune profiles collected in 1982 along Island Beach spit, New Jersey to determine the degree of protection afforded by the existing system.

Currently, coastal hazards are managed by the Federal Emergency Management Administration (FEMA) according to requirements of the National Flood Insurance Act of 1968 and to regulations developed by FEMA. FEMA has recently recognized the importance of dunes as protection and now all of the foreduneid included in the V-zone. In addition, FEMA has prescribed a desired dune volume to provide protection against the 100 year storm. This dune volume was derived from Hallermeier 's study. This value is useful when a well-developed dune exists, but many shorelines are heavily developed, and, when present, the shape and size of the dunes vary tremendously. The existing beach/dune system may not conform to the protection requirements of FEMA, but it does provide some protection. The problem is to determine the protection that exists in a given location with a given beach/dune topography. The technique presented here allows the shoreline manager to evaluate that level of protection.

Hallermeier, R.J.,1987. "Applying large replicas of shore erosion by storms." Coastal Sediments 87. American Society of Civil Engineers, New York. pp. 1415-1429.

MONITORING USER IMPACTS IN THE ST. MARY'S WILDERNESS AREA, VIRGINIA by J. R. Gentile, Department of Geology and Geography, James Madison University, Harrisonburg, Virginia 22807, and
M. Hardi, P. Harmon, and J. Robb, Department of Geology and Geography, James Madison University, Harrisonburg, Virginia 22807.

This paper reports the results of a study conducted in the St. Mary's Wilderness Area in Central Virginia. The research project was designed to establish baseline data on the physical condition of all A-1 campsites within a designated study area against which future impacts and rehabilitation efforts can be measured. At present, the wilderness value along the St. Mary's River drainage within the wilderness is unacceptable by wilderness definition due to overuse of limited areas.

Soil compaction, slope angle, detritus thickness, extent of bare ground, tree damage, and infiltration rate were evaluated. A total of 44 campsites were located within the study area. Of these, six (6) were determined to be "severely" impacted, 17 were "highly" impacted, and 21 were classified as "moderately" impacted. Most of the severely and highly impacted sites were found close to the trail head or near a popular waterfall.

THE PROHIBITION TAVERN: A NEBRASKA STUDY by Jerry D. Gerlach, Winona State University, Winona Minnesota 55987.

The tavern or saloon is and has been a prominent and legitimate part of the American landscape since settlement, except for the period from 1919 until 1935. The purpose of this paper is to analyze the tavern during the prohibition era. The prohibition movement was a serious one by 1910. Hence, the tavern was studied from 1910 until repeal in 1935. The tavern was studied in three stages from 1910 to 1917, 1917 until 1933, when it was illegal, and finally from 1933 to 1935. The tavern was examined in four different counties that were occupied by four different culture groups; German, Bohemian, and two old stock white American ones. Various aspects of the tavern and culture were viewed. These included tavern numbers, ratios, operators, location and the relationship of the institution to government and to the community.

The tavern was found to be important to German and Bohemian Americans throughout the study period. The tavern was found to vary in importance for the Anglos. In one Anglo area, the tavern went from illegitimate to legitimate while in the other area, Hamilton County, its legitimacy was questionable throughout this era. The prohibition tavern was a good indicator of culture, varying in form and function temporally and spatially just as culture did. Taverns and drinking were important to all the areas during this era.

THE LANDSCAPE OF POLITICS IN BELFAST NORTHERN IRELAND by R. L. Gerlach, Southwest Missouri State University, Springfield, Missouri 65804.

Since 1969 Northern Ireland has been embroiled in a new and seemingly endless round of sectarian violence pitting Catholics against Protestants. Catholics seek an end to British rule in Northern Ireland while Protestants seek to maintain their political ties to the U.K. The conflict is most intense and visible in Belfast the impoverished capital of Northern Ireland. The landscape of conflict in Belfast is the product of a number of interacting variables. The identification of territoriality is clearly visible and is expressed through the national identity of the two groups who live, for the most part, separated from one another. The presence of opposing paramilitaries is clearly apparent through the variety of wall paintings and graffiti that appear in the inner city ghettos of both groups. Important events, causes, and heroes also find expression on the walls of both communities, often appearing as elaborate works of art. The status of events is expressed with slogans of various kinds as well as instructions to the local population on how to deal with particular situations. Memorials to the causes of both sides appear in various forms in both communities. Visible efforts to protect property are elaborate and have taken on a permanence. They include screens, walls, and barriers of various kinds. The visible presence of security in Belfast has undergone change as the government has attempted to Ulsterize and normalize the situation. British troops, once commonplace, are now in the background as the police have assumed a greater role in providing security. A variety of measures have been taken to improve the appearance of Belfast and place the security operation in the background. While change is occurring, the basic problem appears no closer to solution than it was twenty years ago.

MANAGEMENT-INDUCED CHANGES IN "INNATE" SOIL ERODIBILITY, by Philip J. Gersmehl, Department of Geography, University of Minnesota, Minneapolis, MN 55455

The 1985 Food Security Act is landmark legislation. For the first time in the history of United States farm policy, there is an explicit link between erosion control and eligibility for farm price supports and other federal subsidies. Implementation of the Act requires the Soil Conservation Service to classify all annual-crop fields into three categories: highly erodible land, potentially highly erodible land (depending on crop cover), and non-erodible land. The tools for this classification are the county soil survey, the Universal Soil Loss Equation, and the Wind Erosion Equation. Unfortunately, both equations treat "soil management" and "innate soil erodibility" as independent variables, which are combined with data on climate, field orientation, slope angle, and slope length in order to derive an estimate of actual soil erosion. As part of a larger study of land-classification methods, we interviewed farmers, district conservationists, and other soil professionals in nearly 400 counties in 44 states. More than 230 of our interviewees cited at least one locally important soil that appeared to change its erodibility under long-term management in a locally common way. We have grouped these identified problems into ten broad categories for display on a generalized small-scale map. This paper is a follow-up report on several of the most important of these groups -- at the time this abstract was written, we were inclined to report on our research in regions with forested loess, grass-stabilized sand, calcic layers, claypan soils, fragipans, and plinthite. That list may change in the next six months.

THE ROLE OF LANGUAGE IN HEALTH CARE DELIVERY by Wil Gesler, Department of Geography, University of North Carolina, Chapel Hill, NC 27599-3220.

Language as studied by geographers is usually treated through the main themes of cultural geography: regions, origins and diffusion, and cultural ecology. Recent work in cultural geography stresses the importance of language as it relates to meaning, ideology, and symbolic landscapes. Medical geographers should be more aware of the importance of language in their studies of health care delivery. There is a growing literature of social science studies, in anthropology in particular, that deals with language in health care situations. This paper introduces the concepts of language as communication; as a taxonomic device; as it creates metaphors, myths, and models; and as it is used in semantic networks; and applies these concepts, with illustrations, to health care delivery issues.

A NEW STATISTIC FOR THE IDENTIFICATION OF SPATIAL AUTOCORRELATION by Arthur Getis, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

Spatial autocorrelation in a variable can be identified in a number of ways. Typical measures are Moran's I, Geary's c, join-count statistics, and the estimations of the spatial autocorrelation coefficients found in spatial autoregressive models. Introduced in this paper is a new statistic, G, that can be used as a measure of spatial autocorrelation in a number of circumstances. The statistic is derived, its properties are identified, and its advantages explained. A comparison is made between G and I and c for similar empirical conditions. These situations range over a number of geographic settings including different sample sizes, spatial configurations, and spatial lags. The main evaluation criterion in each case is the closeness of the three statistics to an estimated spatial autocorrelation coefficient of an autoregressive model. Results indicate that in a number of circumstances G is a better indicator of spatial autocorrelation than either I and c.

"LESSONS FROM JAPANESE ECONOMIC DEVELOPMENT FOR THE ARAB WORLD" by Baher A. Ghosheh, Edinboro University, PA 16444.

This study seeks an alternative approach to development in the Arab world, an approach that preserves and accommodates the Arab culture, capitalizes upon the region's locational, physical, and human resources; and provides for a viable new Arab role in the global economy.

The Japanese strategy is examined as a possible alternative model for Arab development. This study therefore probes into Japan's development experience and contrasts it with the development experiences of three representative Arab countries : Egypt, Kuwait, and Jordan.

The study finds that Japan's spectacular economic accomplishments can be attributed to both the effective incorporation of domestic culture in the country's development and the economic policies pursued by the Japanese government. The study then proposes innovative ways in which Arab culture could be incorporated into the development process and suggests specific policy shifts deemed necessary for the pursuit of these development goals.

Furthermore, the study concludes that the region's long-term development rests upon its ability to restore its traditional middleman's role in the global economy. This role draws upon the region's geocentric geographic, politicoeconomic, and sociocultural location. The upgrading of human resources emerges as the critical factor determining the region's ability to develop into an outward-looking service-based Arab economy.

AREAL CHANGE OF THE OMO DELTA, ETHIOPIA, USING DIGITIZED SPACE SHUTTLE PHOTOGRAPHY, by, R. R. J. Mohler, Lockheed-ESC, 2400 NASA Road 1, MC C90, Houston, Texas 77258, M. R. Helfert and K. P. Lulla, Space Shuttle Earth Observations Office, Mail Stop SN15, Houston, Texas 77058, and J. R. Giardino, Departments of Geography and Geology, Texas A & M University, College Station, Texas 77843.

The delta of the Omo River is located at the northern extreme of Lake Rudolf (Lake Turkana) at approximately 4.5 N, 36 E. Although the delta itself is located in Ethiopia, nearly all of Lake Rudolf is situated in the steppes of Kenya. The flow of the Omo is derived primarily from the highlands of the Shengema Ye'Terara Senselet of Ethiopia, the source of the River.

Through the use of digitized and registered Space Shuttle photography we have documented a substantial (nearly 300%) aggregation. The primary cause of this increase is attributed to deforestation and resulting erosion, albeit fluctuating lake level is also a contributor.

Presented as well are techniques for enhancing Space Shuttle photographs for better interpretation, and results of classification algorithms with the digitized photographs.

VENTURE CAPITAL, HIGH TECHNOLOGY INDUSTRY AND REGIONAL DEVELOPMENT by D.C.GIBBS, Centre for Employment Research, Department of Environmental & Geographical Studies, Manchester Polytechnic, Manchester, M1 5GD, United Kingdom.

In many developed industrial nations there has been a dramatic increase in the availability of equity capital through the venture capital industry in recent years. It has been argued that venture capital is an integral part of the well developed technological infrastructures, or social structures of innovation which characterise established high technology regions. Venture capital provision is thought to be vital for the development of high technology industries upon which hopes of industrial revitalisation frequently rest. However at the regional level the provision of venture capital is unevenly distributed over space.

This paper examines the workings of the venture capital market within the United Kingdom. It does so by an analysis of interviews with venture capitalists in the UK regions, and outlines the implications for regional development. Particular attention is given to the notion that the availability of finance is likely to be an important contingent factor in the process of uneven development involved in the current round of restructuring.

PESO DEVALUATIONS AND ECONOMIC INSTABILITY IN THE U.S.-MEXICO BORDERLANDS by L. J. Gibson, University of Arizona, Tucson, Arizona 85721 and J. T. Peach and C.A. Erickson, New Mexico State University, Las Cruces, New Mexico, 88003.

The U.S. side of the U.S.-Mexico border region has received considerable attention in the literature. A primary focus of this research has been transborder economic interaction. According to the current literature recent events in Mexico can have serious impacts in the U.S. This paper analyzes the several devaluations of the Mexican Peso from 1976 to the present. The impact of these devaluations on the stability of employment and income is the focus of our research. Analyses indicate that impacts are not felt across the board but rather are concentrated in selected, especially sensitive, sectors.

RADICAL FORMS OF BUREAUCRACY? WOMEN ORGANIZING IN THE TRANSPORT AND GENERAL WORKER'S UNION by M. Gilbert, Clark University, Worcester, MA 01610.

The purpose of this paper is to explore the relationship between feminism and bureaucracy. Specifically I will ask if it is p possible for women to advance their position in society by organizing in what some would label inherently antifeminist, male dominated, bureaucracies. Using the Transport and General Worker's Union, the largest union in Britain, as a case study, I will argue that there is a compromise that allows women to organise in the unions without giving up the very principles on which feminism is based. Women need to organise in separate structures which are well integrated into the union's hiearchy and bureaucracy

"GLOBAL WARMING AND THE NEED TO MAKE TORONTO INTO A COMPACT, EUROPEAN-STYLE CITY AGAIN" By Richard Gilbert, Metropolitan Toronto Council.

Immigration patterns and relative poverty kept Toronto more in the form of a compact European city rather than a sprawling North American city -- at least until the 1960s. Since then, fuelled by some unforgivable provincial decisions about the structure of local government, the Toronto region has sprawled rampantly across southern Ontario. Levels of land use, transit use, and energy use are now hardly different from North American means. The imperatives of global warming demand that all this be changed, that Toronto once again become compact, transit-oriented, and, above all, frugal in its use of energy for transportation, heating and cooling, and industry. This presentation will discuss whether these things can be done.

FARM LEVEL RESPONSES TO CHANGES IN THE COMMON AGRICULTURAL POLICY: A REPORT ON THREE STUDIES IN SOUTH WEST ENGLAND by Andrew W Gilg and Andrew Griffiths, Department of Geography, University of Exeter, Exeter EX4 4RJ, United Kingdom.

In the early post-war years agricultural policies encouraged farmers to expand production at all costs. Since around 1980 however the growing costs of this policy in overproduction, excessive subsidies and environmental degradation have encouraged a new direction in farm policies.

The first real change of direction came in 1984 with the introduction of milk quotas. These hit South West England, the prime dairying area of Great Britain, very hard and so a good deal of research at Exeter University, which is at the heart of the South West Region, has been directed to farmland responses to these changes, both in terms of agricultural and non-agricultural enterprises.

This paper presents the results of three studies into land use change on the ground. Study A, the response to milk quotas in two areas of Devon; Study B, attitudes to diversification in three areas of Devon; and Study C, attitudes to changes in the wider rural economy in twelve parishes in Cornwall.

TRANSITION TO A FOUR-SEASON RESORT DESTINATION: ISSUES AND PROBLEMS IN WHISTLER, BRITISH COLUMBIA by Alison Gill Simon Fraser University, Burnaby, British Columbia, V5A 1S6, Canada

As resort communities evolve there are times when the impact of change is particularly evident. Such periods of transition between major phases of the resort cycle create problems within the community as residents and business people seek to adjust to altered social and economic conditions. In this paper issues relating to the transition phase of Whistler, B.C. from a ski resort serving primarily a regional market, to a four-season destination resort with a "world-class" image, are examined. Findings are based on community-based research involving in-depth interviews with key informants and residents, and other published and unpublished community reports.

With rapid development of high-priced condominium units and externally-financed hotel properties patterns of investment and associated community control have changed. Issues of particular concern to residents include: the influence of rising property values on service sector employee housing; provision of community services, such as recreational facilities for residents; concern by resident entrepreneurs over competition from larger external investment companies and; concern over the ability to not only adequately predict impacts of rapid development but also maintain community control over growth.

A FRAMEWORK FOR MODELING AND SIMULATING SPATIAL DYNAMICS IN GEOGRAPHIC INFORMATION SYSTEMS USING THE INTEGRATED DYNAMIC ECOLOGICAL ANALYSIS SYSTEM (c) by James D. Clark, Robert M. Itami, H. Randy Gimblett, George L. Ball, The University of Arizona, School of Renewable Natural Resources,Tucson, Arizona 85721

This paper will present a conceptual framework for modeling spatial dynamic systems that employs discrete event theory and cellular automata. Discrete event theory is applied to control the model as a set of hierarchical events through a conceptual time space. Cellular automata theory is applied as a method for interpreting the spatial variability of the system. This modeling and simulation framework is derived from the research areas incorporated under the banner of IDEAS, the Integrated Dynamic Ecological Analysis System, and uses current resource assessment procedures exemplified by geographic information systems (GIS). This paper will discuss a conceptual framework for modeling and simulating spatial dynamics. Research under IDEAS has the potential for generating applications in a variety of areas. An example of this could be resource managers simulating environmental management scenarios. This would aid in understanding the temporal nature of environmental systems for natural resource planning decision making.

THE EFFECT OF LAND-USE CHANGES ON RAINFALL-RUNOFF RATIO IN THE SCHOHARIE CREEK WATERSHED by Gailya T. Glawson, Department of Geography, SUNY-Binghamton, Binghamton, New York 13901.

Changes in hydrologic and geomorphic characteristics of a watershed that has been urbanized are often studied as are channel modifications that occur downstream from a dam. Less commonly studied are variations in direct runoff in a basin that has been modified by water management projects.

The Schoharie Creek watershed in the northern Catskills is the site of a New York City water supply reservoir and also a pumped storage hydroelectric project. The watershed is rural in nature and is subject to flooding events that usually occur in the spring. The purpose of this study is to determine changes in rainfall-runoff ratio in the Schoharie basin from pre-dam construction to the present time. A quantitative analysis will be made of the relationship between rainfall-runoff variations and land-use conversion in the watershed. Specific flood events and peak discharges will also be examined.

THE ST CLAIR RIVER AS A RELIGIOUS BOUNDARY by Allan Gleason, Retired, Willowdale, Ontario M2M 2E4.

Lambton County ON and St Clair County MI are physically similar, but divided by a natural boundary and a coincident national boundary. Sarnia ON and Port Huron MI face each other across the St Clair River, and are joined by the two most important of the five transportation links across the boundary. I will compare certain religious patterns in the two cities and the two counties, among them, denominational distributions, church architecture, names of congregations, and related features. In doing so I will look at changing patterns over some four decades.

Some of these patterns show clear differences, of several different sorts. I will claim that some of these, e.g. a greater number of Anglican churches on the Canadian side, are related to the national boundary and the different systems it separates. Others, e.g. greater numbers of Lutherans on the US side, are not, or are related only in a much less direct way. The evidence for such discriminations is found in patterns within the two study areas, in comparison with other boundary areas (those across the St Marys River, the Niagara River, and the St Lawrence River), and in comparison of these areas with their hinterlands.

THE DEMOGRAPHY OF HOUSING IN PHOENIX by Patricia Gober and Kevin E. McHugh, Department of Geography, Arizona State University, Tempe, Arizona 84287-0104.

The purpose of this paper is to investigate the nature and strength of relationships between housing and household characteristics for a sample of Phoenix area residents. Two central questions are addressed: (1) who lives in what types of urban housing, and (2) how do recent movers differ from stayers?

Results reveal significant associations between household characteristics (size, presence of children, and age) and housing variables (age, type, size, and tenure), but the level of explanation is unexpectedly low. We attribute this finding to the mixing of household characteristics across the housing stock and to the confounding of life cycle, period, and cohort effects.

Comparison of recent movers and stayers reveals that recent movers are younger and have, on average, larger households than stayers in dwelling units with two or more bedrooms, in rental housing, and in apartments and condominiums. We believe the in-migration of bigger househols to rental units reflects increasing constraints in the homeowner market.

MODERNIZING THE BRAZILIAN CITY: URBAN MORPHOLOGY AND SOCIAL SPACE by Brian J. Godfrey, Vassar College, Poughkeepsie, NY, 12601.

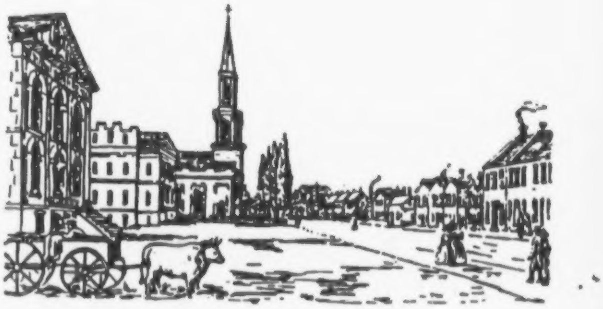
This paper presents a historical-geographical model of Brazilian urbanization, based on supportive evidence found in various cities. The model emphasizes three critical phases of social and morphological change:

1) Colonial initiation saw towns founded in strategic sites for administration, transport of plantation products, and mining. It is commonly assumed that Portuguese settlements differed from new Spanish towns in the Americas in their spontaneous emergence as "organic" medieval forms; in fact, Portuguese towns developed through clearly conceived planning principles.

2) Mercantile expansion, resulting from increased trade in coffee and other primary commodities, further developed urban infrastructure and nascent industry. The Brazilian city acquired a more dynamic land-rent system, as private capital financed speculative building.

3) Capitalist industrialization, promoted by the state, enlarged and segregated the city. Tertiary activities expanded in the urban core, and middle-class neighborhoods grew up nearby; elites clustered in outlying residential sectors with amenities, along fashionable beachfronts, or in secure, enclosed housing compounds. Working-class areas and shantytowns were relegated to less desirable terrain.

In sum, the Brazilian city continues to show a greater concern with centrality than is generally true in North America, but the forces of urban dispersal now proceed in earnest, taking historically specific forms.



DO TRADITIONS, SUSTAINABILITY, AND INTERNATIONAL ECONOMIC DEVELOPMENT MESH? INSIGHTS FROM LADAKH by Peter G. Goering, Energy and Resources Group, Room 100, Building T-4, University of California, Berkeley, California 94720.

Calls for sustainable development often include references to "grass roots initiatives", using "indigenous knowledge", and preserving "cultural diversity". This paper examines the contradictions of promoting local-based development within the context of development policies that emphasize national and international economic integration. Ladakh, an ancient Himalayan kingdom that is now part of the Indian state of Jammu and Kashmir, provides a case study of the ways in which conventional development strategies undermine local practices that historically have met both the needs of the community and maintained ecological stability. During the last fifteen years the government has sponsored a variety of development programs including: the expansion of energy and transportation infrastructures, development of health and agricultural extension services, and the establishment of a primary and secondary educational system. There is now evidence of growing social and environmental stresses.

The paper concludes that the examination of the flow of information is critical to understanding the difficulty of generating meaningful local participation. The informed participation by villagers in the development process is virtually impossible since they do not have access to information on the broader goals of development, nor on the results of development programs in other regions. Information transmitted through the media, visitors, and the formal education system lead to inaccurate perceptions and expectations that will be almost impossible to meet. At the same time, traditional systems of learning and teaching are ignored making the reproduction of local knowledge increasingly difficult.

THE CANADIAN AND U.S. EXPERIENCES WITH AIRLINE DEREGULATION by Andrew R. Goetz, University of Denver, Denver, Colorado 80208.

Over the last ten years in both Canada and the United States, there has been substantial liberalization of government control in each country's domestic airline industry. In the U.S., this was exemplified explicitly through the promulgation of the 1978 Airline Deregulation Act, whereby regulatory control over route entry, exit, and fares was phased out, and the Civil Aeronautics Board (CAB) was terminated. In Canada, de facto deregulation has been in existence as a result of the government's "freedom to move" policy which has allowed more open entry and exit.

The experiences with airline deregulation in both Canada and the U.S. have led to certain readily identifiable trends. There has been a tendency towards increased industry concentration, replacing a regulated oligopoly with an unregulated one. Quantity of service has generally increased, especially for the largest markets, but service quality has declined. Fares were lower in the first few years of deregulation, but with recent trends toward increased industry concentration, average fares have been rising.

The major difference between each country's deregulation experience has been that the aforementioned trends have generally been more pronounced in the U.S. case. The U.S. has more aggressively adopted and promoted the philosophy of deregulation, while Canada has maintained more of its regulatory structure.

THE STATUS OF URBAN SERVICES UNDER *PERESTROYKA:* PRELIMINARY OBSERVATIONS by Robert Gohstand, California State University, Northridge, Northridge, CA 91330

Gorbachev-era restructuring has had distinctly mixed results, extending personal liberties and the independence (and aspirations) of national groups while producing a variety of positive and negative effects in the Soviet economy. As an example of negative results, noticeable dislocations in the availability of consumer products, including food, are widely reported. This paper, based in part on the author's previous researches on Moscow retailing, presents results of an exploration of developments in the provision of selected urban services during the Gorbachev period, as reported in media accounts and standard statistical publications. Subjects of interest include numbers of providors, qualitative shifts, introduction of new categories of services, and the role of cooperatives in such areas as retailing, service functions, and transport. The selection of services for study has been influenced by data availability and represents a sampling which requires further exploration and field corroboration.

HOUSING THE ELDERLY: THE UNITED STATES AND CANADIAN EXPERIENCE by S. Golant, Department of Geography, University of Florida, Gainesville, FLA

Over the last two decades, both the United States and Canada have experienced similar changes in their elderly populations in terms of their proportions of the total population and their demographic structures. The ratio of the population over sixty-five to the working age population has increased dramatically and the predominance of females and single persons, particularly among the older elderly, is a common attribute. Projections indicate similar increases in these trends in the future, although the demographic significance of the baby boom is greater in Canada than the United States.

In contrast, the institutional contexts for development of alternate strategies for housing the elderly are substantially different in the two countries The private sector plays a much more central role in the U.S., while public sector spending is more important in Canada; also institutionalization of the elderly has reached much higher levels in Canada than south of the border. Using data from a variety of sources, both the details of the demographic commonalities and the differences in institutional responses to housing the elderly between the two countries are explored.

THE SOCIETAL MANAGEMENT OF ENVIRONMENTAL CHANGE by Dominic Golding, Roger E. Kasperson, and Samuel J. Ratick, Department of Geography/CENTED, Clark University, Worcester, MA 01610.

Much current discussion of the management of global environmental change is strongly normative, exhortatory, and programmatic. Little critical thought addresses the sociopolitical feasibility of management alternatives, or the diverse approaches necessary to cope with the array of intraregional, transregional, and global causes and effects. This paper will outline the theoretical framework to be used in the assessment and evaluation of societal responses to, and management of, environmental change in the study of critical zones.

The paper will present a framework for characterizing "response pools" -- the repertory of responses on which societies draw to meet environmental challenges. Alternative taxonomies will be developed for reconstructing societal responses over 50 to 100 year time frames in each critical zone. These taxonomies will pay particular attention to the diverse sources of "societal surprise," and the contrasting societal coping mechanisms. Finally, the paper will present criteria to be used in evaluating the effectiveness of societal responses to different threats, at different times, and in different places. These criteria include: the ability to recognize warning signals, to interpret causes and effects, and to select appropriate responses; the timeliness of diagnosis and response; the adaptability of societal management mechanisms; and, the ultimate impact of responses on the basic driving forces of environmental change.

GEOGRAPHIC CONTRIBUTIONS TO UNDERSTANDING INDIGENOUS RESOURCE MANAGEMENT SYSTEMS by A. Goldman, Geography Department, University of Florida, Gainesville, FL 326]]

The long standing involvement of geographers with resource management issues allows them to make important contributions to research on agricultural sustainability. This paper reviews recent experience of defining a perspective and methodology for resource management research at the International Institute of Tropical Agriculture (IITA). A central mandate of the Institute has been to try to devise sustainable alternatives to shifting cultivation in the humid tropics. Most IITA research in this area has concentrated on soil studies and the development of the alley cropping system, with little or no work analyzing existing indigenous systems of resource management and the dynamics by which they change. The author and his colleagues at IITA examined indigenous resource management in the high density regions of southeastern Nigeria. The results of this study, which are summarized in this paper, helped to point out the importance of a number of issues that had not previously been addressed at IITA and for which geographers may have a comparative advantage. These include the role of increasing population density as a stimulus to some, though not all, kinds of innovation; the existence of significant intervillage variation and the implications of this for research design; the nature of fallow fields as a human-managed ecology generating a range of economic and non-economic outputs, some of which play key roles in farmers' resource management decisions; and a suggested interdisciplinary research strategy using a human ecology perspective to identify technology needs for resourc management in different kinds of peasant farming systems.

DEVELOPMENT OF A GIS FOR OCEAN DISPOSAL OF DREDGED SEDIMENT FROM NEW YORK HARBOR by Victor Goldsmith, Keith Clarke, William Hansen, Dept. of Geology and Geography, Hunter College, 695 Park Ave., N.Y., N.Y., 10021 and Henry Bokuniewicz, Marine Sciences Research Center, SUNY-Stony Brook, Stony Brook, N.Y., 11794

The infrastructure for a New York Bight Geographic Information System (GIS) has been constructed in the Remote Sensing and Spatial Analysis Laboratory at Hunter College. This GIS will serve as a management tool for the New York District Corps of Engineers. Approximately 50 GIS data layers were digitized, rectified to UTM cordinates, and gridded at a 500 m cell size. These parameters included locations of various commercial and recreational fishing grounds, benthic biomass, sediment characteristics, pollutents, and currents.

Analyses were conducted to investigate various scenarios related to the choice of alternative sites for the disposal of dredged sediments emanating from New York Harbor, including proposed candidate sites. In the simplest approach, seven out of the more than 50 parameters were chosen by the Corps as criteria, overlayed, and the number of "hits" was calculated for the shelf. From this, the shelf was graded from the most suitable to the least suitable locations. Further clarification is achieved by a more detailed analysis in which the shelf is divided into 56 different categories, each a unique combination of the seven criteria. In this way, distinction can be made as to the relative importance of the seven different parameters.

A more sophisticated approach involves weighting the different parameters such as the more important fish species, entrance channels to NY Harbor, etc. and rating the shelf from most suitable to least suitable locations.

This GIS is considered an ongoing effort in which additional parameters are added, existing data refined, and various manipulations are made in order to respond to a wide variety of management considerations for the New York Bight, as they arise.

"Navigation Without Sight: Components of an Automated Pedestrian Guidance System"

a paper for the annual meeting of the AAG, Toronto, 1990
by Reginald G. Golledge and Andreas Flury, University of California, Santa Barbara

This paper reports on a project concerned with the development of a large spatial database at a small spatial scale. Knowledge about current location is the first crucial piece of information to successful travel. The purpose of the database is to provide blind travelers with information about their present location ("Where Am I"), as well as with route information for successful navigation through space. Diverse techniques to solve the "Where Am I" problem are discussed. Problems with data acquisition, scale choice, types of data and data structures are examined. Potential benefits of the use of the database for navigational tasks such as path selection, hazard identification and obstacle avoidance are described.

STRUCTURAL GEOMORPHOLOGY OF SOUTHEAST TROODOS, CYPRUS

by Basil Gomez, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809, and Simon Allerton, School of Environmental Sciences, University of East Anglia, Norwich NR4 7TJ.

The Troodos Ophiolite Complex, Cyprus, is a remnant of oceanic crust that was formed at a constructive plate margin, adjacent to a transform fault. The role that diastrophic processes have played in the formation of the Troodos Massif, Cyprus, is well known. In recent years knowledge of the evolution and morphology of those areas of the ocean floor where comparable processes are operating today has helped to elucidate the tectonic setting of the massif. We demonstrate, through an analysis of structural relations elucidated by field mapping and with reference to the physiography of the contemporary ocean floor adjacent to an accreting plate boundary, that the gross morphology of a 170 km^2 area of the southeastern portion of the Troodos Massif, in the vicinity of Pano Lefkara, reflects that (and developed in the context) of a mid-oceanic spreading centre. Further, we show how the description of individual landforms may be enhanced by a knowledge of the mid-ocean ridge environment.

The gross morphology of the study area exhibits a horst and graben configuration. The horst blocks are composed of sheeted diabasic rocks, while pillow lavas occupy the floor of the intervening graben. Consideration of the physiography of the study area as a whole, exemplified by the structure and morphology of a small constructional volcanic hill, suggests that it evolved in two phases. The principal phase of development involved a period of crustal extension and volcanic acitivity at a spreading centre, and the second phase a period of off-axis volcanic and tectonic activity.

LATIN AMERICA: REGIONAL CHANGES IN POPULATION

by A. Gonzalez, University of Calgary, Calgary, Alberta T2N 1N4.

The rate of overall population growth of Latin America has been declining since the early 1960s. However, the annual absolute growth has continued to increase to approximately nine million at present. It is currently about ready to cease increasing although population growth is projected to continue well into the next century.

There are two major population movements within the countries of Latin America: (1) the rural to urban exodus, and (2) migration into the more sparsely settled regions. The migration into urban areas is the larger of the internal movements and the rural population is probably no longer growing, if it is not already decreasing.

The approximate populations and rates of growth of the 13 natural regions of Latin America are reviewed over the last few decades. The traditional areas of settlement, the Antilles, Middle Chile, the La Plata-Parana Basin, the Cordilleran and Brasilian Highlands have been increasing in population at a relatively slow rate or very slowly in the case of the Antilles, by far the most densely settled region. These regions still account for more than four-fifths of Latin America's population on half of the total area while the two highland regions alone account for two-thirds of the absolute increase in population numbers. The empty areas of Latin America have been growing rather rapidly, except for South Chile and, recently, the Guiana Highlands. Growth is especially pronounced in Amazonia and, also recently, in Northwest Argentina-Patagonia.

"WALK DOWN THE HILL AND TURN LEFT..."

Sucharita Gopal Department of Geography, Boston University, Boston, MA 02215.

How do people give navigational directions? What are the essential features of such directions? How does language transform or structure the underlying spatial representation into verbal directions? These questions form an important topic of research and lie at the interface of spatial cognition, spatial reasoning, and language. We examined these issues by conducting a preliminary study in a complex urban neighborhood, the UCLA campus, where 32 adult subjects were solicited to give navigational directions between two locations in a forward and a reverse direction. The route involved some complex turns and a variety of visual information.

Protocol analysis revealed some interesting results. There were differences in the use of landmark information and frames of reference in the forward and reverse navigational tasks. Although the same landmarks are present in both the trials, what can be seen from them varies according to the orientation and viewer-perspective leading to disparities in the description of the route in the two tasks. Subjects in the forward trial seem to rely more on an ego-centric and object centered frame of reference; a global frame of reference was used in the reverse task, in which subjects seem to encode and then describe the route with respect to the north direction. Such differences in the use of the reference frame may be related to the general significance of North direction in our cognitive maps (noted by other researchers) or North campus may be a significant landmark or area in UCLA campus. In addition, subjects seem to transform their survey knowledge into some form of route knowledge to give navigational directions.

In this paper, we discuss the experimental results and the implications of such findings in constructing a cognitive model of navigation and direction-giving.

AFTER THE BIG ONE: WATER, WATER EVERYWHERE..BUT NOWHERE

by Roni Gordon, Research and Occupational Safety, University of California, Los Angeles, CA 90024-1364.

The last great California earthquake was the 1906 San Francisco earthquake---the next Big One is expected to take place in Los Angeles. There is a 60 percent chance that this event will occur in the next 30 years.

After the 1906 quake, the failure of San Francisco's water system (broken mains) left firefighters helpless against a firestorm that quickly destroyed the city. What kind of post-quake scenarios can be forecast for the baroque network of aqueducts, reservoirs, tanks, and mains that comprise the Los Angeles water system?

This presentation will examine the series of potential post-earthquake water disasters facing emergency planners in Los Angeles---ranging from widespread water shortages, possible firestorms in highrise districts and hillside chaparral, or catastrophic reservoir failure and flooding.

IMPACTS OF GIS INFORMATION LOSS ON A NONPOINT POLLUTION MODEL

by Steven I. Gordon, Department of City and Regional Planning, The Ohio State University, Columbus, Ohio 43210.

A linkage between a GIS and an agricultural nonpoint pollution model is being used to automate the analysis of the impacts of alternative level management policies. Of concern is the impact of information loss resulting from rescaling operations within the GIS on the accuracy of the representation of model results.

Tests are run using GIS datasets of the same sample areas at three different scales. Comparisons are made of simulation results for the average sediment loads, the range of sediment loads predicted by the model, and the form of the distribution. It is hypothesized that as the complexity of the landscape being modeled increases, there is a greater loss of information on the potential consequences of land management changes as the scale decreases. Several potential metrics of these impacts are tested and compared.

"Property relations in a Metro Manila squatter settlement", by Jon D. Goss, Assistant Professor, Department of Geography, University of Hawaii.

This paper examines property relations in squatter-slum communities in Metro Manila, and in particular, it attempts an understanding of the landlord/lady-tenant relation. It argues that while this is fundamentally a class relation, which at the structural level is defined by an antagonism in material interests, there are various "types", or contingent forms of the relation, that are mediated by other relations between the two social categories. The question then to be addressed is whether these specific forms of the relationship are mere glosses that legitimate or obscure the objective fact of exploitation, or whether they entail an entirely a different form of property relation.

The paper presents results from survey and interview research in squatter areas and presents a classification of the various types of landlord/lady-tenant relations as distinguished by the nature of the capital investment, the relative prioritization of profit over income stability, and social committment to the welfare of the tenant. It presents case studies which illustrate the importance of mediatory social relations, and even in several cases, the ultimate transcendence of the owner-tenant relation to voluntary co-ownership, contrasting starkly with the penetration of the squatter area by professional slumlords.

It is hoped that this paper will contribute to an awareness that, while property ownership creates inequalities in a class society, at the level of community not all property owners with tenants can be labelled as social parasites. While to some this may be only a relatively insignificant local amelioration of a structural condition, policy makers and practical social scientists need to be prepared to conduct research that goes beyond simple empirical categories based on income, number of houses, owner, tenant or sharer etc. to examine the "real" sociology of slum relations.

THE USE OF MICROCOMPUTERS IN GEOGRAPHIC EDUCATION by Frank Gossette, California State University, Long Beach, CA 90840.

Geography has a long history of computer applications, both in research and in the classroom. The impact of the microcomputer on higher education, in general, has been to bring more and more computing power to the desktops of faculty and students. Computer laboratories have sprung up all over campuses in North America. How are geographers using this technology? Who are the innovators? Where are the centers of educational computing in geography?

This presentation summarizes the results of a survey of North American geography departments on the use of microcomputers in teaching at the college and university levels. Respondents were asked to identify specific program areas -- cartography, methodology, systematic, regional -- in which faculty were using or developing microcomputer applications. How are personal computers being used: for student projects, classroom demonstrations, preparation of handouts and classroom materials, or other applications? What types of special needs do geographers have?

These survey results can be of great potential value in assessing the impact of the microcomputer on geographic education and for the development of computer applications in the future.

COMPARING DRIVING DIRECTIONS IN ENGLISH- AND SPANISH-SPEAKING CULTURES by Michael D. Gould, State University of New York at Buffalo, Buffalo, New York 14260.

This study compares the methods of giving driving directions in English- and Spanish-speaking cultures. Spanish-speaking subjects in Valencia, Spain and in Merida, Venezuela were asked for driving directions to major public places. Responses were secretly tape-recorded, transcribed, and analyzed using simple exploratory statistics. In Spain, an attempt to control for sex and language bias was made by using both a male non-native and a female native speaker as direction solicitors. The English-speaking study was previously conducted in Buffalo, New York (Mark, 1989 AAG) using similar methodology. Among the results: several American males included metrical distances, whereas no Spaniard did; Mark's conjecture, that the average duration of driving directions is about 45 seconds regardless of distance involved, holds true in Spanish-speaking cultures. Differences in the direction-giving habits of the two cultures have interesting implications for the design of vehicle navigation aids and of geographic information systems which are to be utilized world-wide. More generally, a cross-cultural look at driving directions can aid geographers in attaining a better understanding of fundamental methods of structuring space in urban environments.

EVIDENCE OF A UNIFIED PHYTOSPHERE: A STEP TOWARD GAIA

Samuel N. Goward, University of Maryland, College Park 20742

A few scientists, including Lovelock with the Gaia hypothesis, have postulated that the biosphere of the earth functions as single, unified entity at the global scale. Confirmation of this postulated phenomenon has been constrained by a lack of observational evidence. The recent innovation of terrestrial satellite remote sensing has provided unique new measurements of global vegetation dynamics which are well suited to the evaluation of this hypothesis. Comparison of these observations with reported biome-level net primary productivity reveals a consistency in phytospheric conversion of sunlight to biomass which appears relatively independent of species composition or physionomic considerations. Further, comparison of the satellite-observed global vegetation patterns and simple climate variables, such as temperature and precipitation, suggests that, at the global scale, vegetation systems respond in a unified manner to environmental constraints. These results strongly support the concept of a unified phytosphere which either modifies its internal structure and/or its associated environment to ascertain a "maximal" output within the contraints of the ambient environment. These results do not confirm or deny the posulated Gaia capacity to modulate the ambient environment of the earth to further its existance, but may provide the foundations for testing such a concept.

THE ROLE OF UNIVERSITIES IN PERIPHERAL REGIONS: THE CASE OF BEN-GURION UNIVERSITY IN THE NEGEV by Yehuda Gradus, Department of Geography, Concordia University, Montreal, Quebec H3G 1M8, and Ben-Gurion University of the Negev, Beer-sheva, Israel 84105.

Universities are used to further the economic, cultural and societal growth of nations and regions. Israel is no exception. Institutions of higher education were perceived as part of the nation building process by the Zionist movement. Today Israel has seven such institutes, six of them are in areas of major urban concentration, the seventh, Ben-Gurion University of the Negev, is the exception. The government saw it primarily as a means to build up a peripheral region whose growth is essential to the future development and security of the nation.

Over time, conflicts within the university ensued between goals favoring the region's development on the one hand, and those pursuing national and universal interests and traditional values of higher education on the other. This paper will discuss the development of this conflict and ways in which it has been partially resolved. The focus is on the role of a university in a peripheral region, stressing the problems and limitations of assuming this role. Israel's highly centralized and unitary political system and its impact on the university's role in regional development will be discussed.

PLUTONIUM STORAGE AND FLOOD-PLAIN EVOLUTION, NORTHERN RIO GRANDE, NEW MEXICO

William L. Graf, Department of Geography, Arizona State University, Tempe, Arizona 85287-0104

Surveillance reports, stream gauge data, aerial and ground photographs, and field measurements show a significant connection between fluvial transportation and storage of plutonium and flood-plain evolution along the northern Rio Grande, New Mexico. Plutonium enters the river system from atmospheric fallout and historical releases from Los Alamos National Laboratory. The total amount of plutonium in the upper watershed from atmospheric fallout is about 50,000 mCi, but in the last 20 years only about 160 mCi probably has passed into the main channel in northern New Mexico. Releases from the laboratory into tributary canyons have been transported into the main river by natural entrainment of contaminated sediments, contributing 535-2,376 mCi of plutonium to the main stream.

Plutonium has been stored along the main channel in flood plains that began their histories as the floors of abandoned braided channels. Through the last 45 years, the channel of the northern Rio Grande in New Mexico has become smaller and less sinuous as a result of impoundments, river engineering works, vegetation and climatic changes. Concentrations of plutonium vary spatially across the flood plains as a function of geomorphic history, timing of deposition, and particle size of the sediments.

FUTURE TRENDS IN THE MIGRATION OF THE ELDERLY by Thomas O. Graff, University of Arkansas, Fayetteville, AR 72701 and Robert F. Wiseman, University of Kansas, Lawrence, KS 66045.

Large numbers of older Americans have migrated to a relatively small number of attractive retirement locations located largely within the Sunbelt. In some communities extremely high concentrations of elderly population have resulted. The expanding numbers of mobile elderly have been produced by the simple rapid expansion of the older cohort. During the decade of the 1990's the size of the 65 and older cohort will cease to expand. The purpose of this paper to identify the likely changes in future elderly migration patterns that will be caused by the stability in the size of the older cohort.

Since World War II, the basic migration trend of older Americans have been to the Sunbelt, particularly Florida, California, and Arizona. Much more modest numbers of older persons have moved to Arkansas, Texas, North Carolina, etc. The large migration streams to Florida, Arizona, and California are unlikely to decrease significantly. Because of the high death rates of the elderly and the growing influx of more youthful cohorts, increasing numbers of older migrants are required simply to maintain the existing elderly concentrations. In less popular retirement areas, maintaining the existing elderly concentration will be more problematic. Before the end of the 1990's new geographic distribution of older American will start to emerge.

INDUSTRIAL GEOGRAPHY AND MARXISM: TOWARD AN ALTERNATIVE INTEGRATION by J. Graham, Department of Geology and Geography, University of Massachusetts, Amherst, Massachusetts 01003.

Over the past two decades, Marxist-influenced theoretical frameworks and Marxist-inspired research topics have become familiar and even dominant with industrial geography. Currently, however, the Marxist tradition within geography is being challenged from a number of directions. Critics question its monopoly of the truth and its tendency toward various types of determinism.

Outside geography, in response to such criticisms, new or alternative Marxisms have developed from their long-dormant seeds within the Marxian tradition. Some Marxists have begun to see Marxism as a discourse, a knowledge among knowledges, rather than the single and only "truth" about the world. They have theorized class relations as a focus, or entry point, of Marxist analysis rather than the fundamental or ultimate determinant of social development.

This paper brings a new "anti-essentialist" Marxism to bear on some of the issues that have concerned Marxist industrial geographers over the past several decades: industrial crisis and restructuring, decline and development. Current theories devised to cope with these processes are focused on Fordism and post-Fordism, mass production and flexible specialization, firm integration and disintegration, industrial internationalization and political localization. The emphasis in these theories on new forms of industrialization and the consolidation of viable industrial regimes tends to obscure the role of class in constituting capitalist society and often suppresses the contradictions inherent in all forms of social and economic development. As an antidote to such developmentalist perspectives, an alternative Marxism could direct our attention toward class and contradiction without limiting the richness of industrial geographic discourse.

GLOBAL RESTRUCTURING, THE UNITED STATES, JAPAN AND FOREIGN AID by R. Grant and J. Nijman, University of Colorado at Boulder, Department of Geography, Campus Box 260, Boulder, Colorado 80309-0260.

In the last few years, global restructuring has become a theme of increasing importance to political geographers. A recurring emphasis has been put on the diffusion and diversification of power in the international system. These trends find expression in the relative decline of the superpowers and the increasing importance of economic power over military power. In this paper an attempt is made to investigate these processes by focusing on the different uses of foreign aid as an instrument of foreign policy by the US and Japan. Attention is directed to developments in the patterns of US and Japanese foreign aid, and to the underlying rationales for giving aid. This, then, is related to the broader processes of restructuring that have been, and are, taking place in the world system.

INTEGRATION OF DIGITAL ELEVATION MODEL (DEM) PARAMETERS AND LANDSAT IMAGERY IN A GIS FOR MAPPING MOUNTAIN GLACIERS, Denis J. Gratton and Philip J. Howarth, Department of Geography, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1.

This paper deals with the building in a GIS environment of a glaciological data base as an answer to the management of multi-source and multi-scale information required for the study of mountain glacier variations. A prime data source comes from remote sensing documents including satellite imagery. Topographic information is derived from the currently available 1:250,000 scale DEM of the Surveying and Mapping Branch of Energy Mines and Resources, Canada.

The interfacing of a GIS and IAS (Image Analysis System) permits the inclusion of ancillary glaciological observations in the automated sampling of training and test data for multispectral classification of Landsat MSS and TM imagery. The spatial and spectral resolutions of Landsat MSS imagery provides a first level regional classification of glacial cover, while the resolutions of the Landsat TM imagery permit a more local detailed discrimination.

The ISIF (Intergraph Standard Interchange Format) vector DEM file is read with the ARC/Info GIS package and interpolated in a raster format using a bivariate algorithm available in the TIN (Triangular Irregular Network) module. Slope and aspect coverages are extracted from the raster DEM. The integration of raw satellite images, glacial cover classifications and DEM features in the SPANS GIS package permits the characterization of glacier basins into physiographic units. The output coverages become the basic information to establish multi-date climate and glacier behavior patterns.

SPATIAL STRUCTURE OF TAXA ABUNDANCES IN LATE HOLOCENE VEGETATION RECORDS by Lisa J. Graumlich, Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ 85721.

While climatic forcing appears to be the best explanation for continental-scale movement of plant taxa over millennial time scales, the factors responsible for site to site variation in vegetation history within a region are less well understood. In this study I use spatial autocorrelation statistics to investigate the scale at which individual taxa have varied in dominance within the mixed conifer/hardwood forest of the upper Great Lakes region during the Late Holocene. Records of individual taxa abundances at 2000 year intervals from 500 to 6500 yr B.P. were derived from a network of 32 pollen sites. Correlograms show that spatial autocorrelation, calculated as Moran's I statistic, varies both with distance over the network and through time.

The correlograms of most taxa show significant positive spatial autocorrelation at scales less than or equal to 100 km and significant negative autocorrelation at scales greater than or equal to 250 km. For certain taxa (ex., oak) the structure of the correlograms is stable over time implying that limiting factors are either stationary or have operated over similar spatial scales throughout the late Holocene. For other taxa (ex., pine) there is significant variation in autocorrelation structure through time implying that either the nature of limiting factors has changed or that the scale of variation of those factors have changed through time. Species strongly responsive to disturbance (ex., birch, alder) lack significant spatial autocorrelation at all scales examined due to the fact that disturbance typically operates on scales smaller than those sensed by pollen records.

LANDSLIDE AWARENESS IN AN URBAN ENVIRONMENT: CINCINNATI, OHIO by Jerry E. Green, Geography Department, Miami University, Oxford, Ohio, 45056

Landslides, along with subsidence, are jointly responsible for dollar losses greater than those caused by all other natural hazards in the United States. When allocated on a per capita basis, the annual cost of landslides in Cincinnati and Hamilton County exceeded such costs for other cities more widely known for their landslide problems.

In view of these costs, a question of interest is "how has such landsliding been perceived by the local residents in landslide prone areas?" Field interviews were conducted among randomly selected residents in landslide prone areas to determine the answer to the above question.

The majority of the respondents were aware of landslides in their areas but only a few felt threatened. Over one-half did not know if they had landslide insurance protection.

The majority were not aware of special zoning district designation to protection against landslide losses but the majority felt such regulations were desirable.

PATTERNS OF VENTURE CAPITAL INVESTMENT IN THE UNITED STATES: 1970-1988 by Milford B. Green, The University of Western Ontario, London, Ontario, Canada, N6A 5C2

This paper provides a model of the spatial development of the American venture capital industry. The creation of market niches by spatial monopoly is presented as the likely development path for new venture capital firms. This has caused the diffusion of venture capital firms since 1970 but not in a systematic way.

The investment preferences for both public and privately owned venture capital firms for the period 1970 to 1988 are examined in light of this model. A three way median polish analysis, of the investment preferences, for firms located in the fifteen largest venture capital centers, reveals a high level of regional parochialism in investment. Differences in risk aversion and industry choice are also found both by city and by firm type.

Quasipublic firms are more risk averse and more spatially biased in their investment choices than are privately funded firms. High technology investments are more likely by private firms and by those firms located in San Francisco, Boston, Denver, and Minneapolis.

QUANTITY AND QUALITY OF DATA AVAILABLE TO STUDY MINORITY CANCER by Michael Greenberg, Urban Studies and Community Health, Rutgers University, New Brunswick, New Jersey 08903

We have examined more than 100 data sets to find the most promising ones for studying cancer among blacks and Hispanics in New Jersey. SEER and non-SEER incidence data, computerized medical records, and death tapes are the most promising data sets. Proprietary data sets may also be made available by some companies. We obtained copies of incidence, medical records, and death tapes. SEER and non-SEER incidence data are being tested for quality--that is, we are testing the data for completeness and accuracy. Our hypothesis is that poor quality data is most likely for elderly, male blacks and Hispanics who are treated in a large, inner city hospitals.

IDENTIFYING THE 1990 CENSUS GEOGRAPHIC AREAS FOR THE AMERICAN INDIAN by Joan Greendeer-Lee, U.S. Bureau of the Census, Washington, DC 20233

The Census Bureau is implementing a number of programs to identify geographic areas for the American Indian communities. This includes providing the American Indian tribal governments the opportunity to participate actively in the identification of these areas. Evaluating the variety of recommendations received from written correspondence by tribal leaders and regional meetings with interested data users, the Census Bureau developed the Block Numbering Area/Block Group Delineation Program for American Indian Reservations, the Block Definition Project, and the Tribal Review Program. The Census Bureau is confident that by implementing these programs, it is capable of providing more accurate information for the native American population than in previous censuses.

A TWO LEVEL TYPOLOGY OF INNER CITY POVERTY SETTLEMENTS by Richard Greene, Shippensburg University, Department of Geography, Shippensburg, Pennsylvania 17257.

This paper presents the findings from a larger study on the location, spatial arrangement, and changing areal extent of poverty areas in large American cities. These extreme poverty areas are the settings of what has become known popularly as the urban underclass. The study employs spatial statistics to derive descriptive measures of the compactness and changing size of poverty areas. The main finding of the study is that definitions of the urban underclass that are based on poverty concentration patterns are too broad to be generalized to the whole American urban system. A two level typology of poverty areas is proposed as a more accurate way to describe the settings in which poor people live. The first typology level is based on the compactness of central city poverty areas, and the second typology level is based on how the poverty status of the poverty area changed over a ten year period.

WET ACID DEPOSITION IN COLORADO IN THE 1985 HYDROLOGIC YEAR by M.C. Silverstein, Environmental Protection Agency, Denver, Colorado, 80202 and David E. Greenland, Department of Geography, University of Colorado, Boulder, Colorado, 80309.

Precipitation and wet atmospheric deposition patterns were investigated for Colorado for the hydrologic year 1985. Above average precipitation for the year probably gave rise to higher than average deposition but this potential varied by season across the state and was higher at higher elevations. Average weekly concentrations of nitrates and sulfates were greatest during spring and summer and the average weekly pH of precipitation is lowest during the fall. Usually, average nitrate and sulfate concentrations decrease with increasing elevation while precipitation pH becomes more acidic with elevation. There was no clear pattern between acid concentration and increasing precipitation but precipitation pH decreased with increasing precipitation. Trajectory analysis suggested that important sources of acid precursors existed to the southwest of the state in 1985, but that areas to the northwest, west, and south, and regions within the state itself, are also likely sources.

NEARSHORE SEDIMENT TRANSPORT AND MORPHODYNAMICS: METHODOLOGY OF THE C-COAST PROGRAMME
Brian Greenwood, Departments of Geography and Geology, Scarborough Campus, University of Toronto, Canada.

The Canadian Coastal Sediment Transport Programme was designed to enhance understanding of the dynamic behaviour of non-cohesive shorelines through the direct measurement of sediment transport and the response of the bottom boundary under combined waves and currents. Detailed measurements of waves and currents have been made using continuous resistance wave wires or pressure sensors and electromagnetic flowmeters while at the same time the structure of the local suspended sediment profile has been determined using Optical Backscatterance Suspended Solids sensors and a Multifrequency, Acoustic Suspended Sediment Profiler (RASTRAN). The relationship between the suspended sediment transport and the bottom boundary has been determined at the scale of the beach profile using measurements from Depth-of Activity Rods and survey methods, and at the scale of the bottom roughness (bedforms) using digital analysis of underwater video-imagery together with a High Resolution Remote Tracking Sonar (HRRTS). Sampling of instruments at 4 Hz for periods of 29 minutes, throughout storm periods has allowed the derivation of unique datasets, which illustrate the highly episodic, time dependent sediment flux as well as the time-averaged response of the bottom boundary to this flux. In this paper a detailed evaluation is made of the experimental procedures used to determine suspended sediment transport and the problems arising in evaluating the spatial divergence of sediment flux.

CANADIAN ELITE RESPONSES TO THE GLOBAL ENVIRONMENTAL CRISIS by Bryn Greer-Wootten, Department of Geography, York University 4700 Keele Street, North York, Ontario M3J 1P3.

Public awareness of environmental problems and issues has surpassed the levels of concern that characterized the popular movements of the late 1960s. Factors affecting this resurgence of broad-scale support for increased government regulation, enforcement and monitoring in the late 1980s may be traced more readily to an elite model of attitude change than to the social movement hypothesis. Data that support this contention are drawn from a continuing annual survey of more than 200 Canadian leading thinkers and decision makers (excluding elected officials) who are asked to identify the major social, political, economic and technological trends that will affect Canada in the next five years. The Hay Opinion Leader Research Program conducts in-depth tape-recorded interviews with respondents from industry, business, federal and provincial levels of government, interest groups, the media, universities and research organizations, with representation from seven regions. In the 1988-89 surveys, about one in nine opinion leaders were experts in environmental issues, but more than 50% of the respondents identified environmental problems as the major issue of the 1990s. Analysis of these interviews centred on the identification of themes, their relative salience and clustering for the expert group in comparison to other opinion leaders, for the 1988 and 1989 surveys. The results demonstrate a diffusion of thematic priorities, with increased salience given to (i) the global environmental crisis, (ii) the political context for necessary changes in decision-making processes, and (iii) the regional impacts of sustainable development scenarios -- a trend that could influence the scale of public concerns.

HABERMAS AND THE GEOGRAPHY OF COMMUNICATIVE ACTION by Derek Gregory, Department of Geography, University of British Columbia, 217-1984 West Mall, Vancouver, British Columbia, Canada V6T 1W5

This paper is in three sections. First, most readings of Habermas present his work as forbiddingly abstract; not surprisingly, therefore, his influence on geography has been equally abstract -- confined, for the most part, to a critique of the philosophy of positivism and to a consideration of the generalized possibilities for a critical science. In the first section I argue that Habermas's recent writings are much more concrete: that they need to be located within the specific context of the Federal Republic of Germany and that any attempt to extend them to other contexts in time and space is far from straightforward. In short, Habermas's theory of communicative action may look like a 'Grand Theory' but it is in fact rooted in 'local knowledge'.

Second, I seek to disclose a more systematic geography that is latent within Habermas's work. I pay particular attention to (a) the connections that need to be established between his account of the 'colonisation of the life-world' and the historical geography of modernity and (b) the contradictions between the Eurocentric focus of his project and the 'other voices' that are an essential part of the post-modern sensibility.

Finally, I measure the distance between Habermas's 'reconstruction' of historical materialism and classical versions of Marxism and, in the light of my preceding arguments, explore the possibilities for a *dialogue* between the theory of communicative action and historico-geographical materialism.

URBANIZATION IN CALIFORNIAN AGRICULTURAL INDUSTRIALIZATION AND IMPLICATIONS FOR RESOURCE POLICY by H. F. Gregor, Dept. of Geography, University of California—Davis, Davis, California 95616

Despite the traditional agricultural preeminence of California's Central Valley, coastal metropolitan counties are increasingly rivaling the region in the very characteristics of the "factory farming" that the Valley has so long almost uniquely illustrated. Representative are the results of a correlation analysis, for the 1950–1982 period and the most urbanized counties of Southern California and the San Francisco Bay Area, of the association of commonly accepted criteria of agricultural industrialization with several urbanization indicators. Strongest of the urban relationships is the high productivity of land. Extensive economies of scale, rapid farm consolidation, and high farm productivity also are noticeable. A trend toward closer urban association for the majority of the variables over this time span is also unmistakable. Notable too are the frequent superiorities of individual metropolitan counties when compared with counties in the productive heart of the San Joaquin Vally

Improving agricultural performance on urban margins does not, however, eliminate resource problems and the need for continual appraisal of resource policy. Farms and farmers continue to disappear, and if the production problem of loss of farmland has been ameliorated by increased intensity, it has also been compounded by the growing threat of excessive production capacity. Externalities such as soil, air, and water pollution also now promise to come to the very threshold of the consumer. Resource problems of agricultural industrialization will therefore continue to merit attention, though with more and often different perspectives and concerns than before.

MANAGING A SHARED RESOURCE: RESILIENCY ENHANCING OPTIONS IN GREAT LAKES WATER LEVELS MANAGEMENT by A.P. Lino Grima, Department of Geography, University of Toronto, Toronto, Canada, M5S 1A1

The management of Great Lakes water levels presents several challenges. First, long-term fluctuations result from unpredictable cycles of persistent high or low annual precipitation. These long-term fluctuations are amplified by storm events which are the major cause of shore erosion. Further efforts to control water levels are limited in scope and costly to implement. Second, the adverse consequences of fluctuating water levels reflect the conflicting nature of water-related economic interests, e.g. navigation, hydro-electric power, recreational boaters and lakeshore property owners. Even relatively small fluctuations in water levels result in very large economic losses to some users and gains to others. Third, CO_2-induced climate change and increased consumptive water uses insert a large measure of uncertainty into policy-making . Fourth, the traditional management approach has exemplified the familiar "policy" trap of developing and protecting hazard-prone areas. Fifth, the split of jurisdictional responsibilities for lakeshore management has typically put the onus of planning on junior levels of government. A comprehensive approach to meet these challenges would include mapping hazard-prone shoreline as a basis for land use regulations backed by economic incentives and legal penalties. These strategies would enhance the resiliency of lakeshore uses in the Great Lakes-St. Lawrence Basin. Shared resources require a shared sense of purpose as a basis for binational management. The suggested comprehensive approach serves as a framework for a review of the progress report on fluctuating water levels to the International Joint Commission.

THE YACHT AS SECOND HOME by Thomas P. Grimes, Department of Geography, Ball State University, Muncie, Indiana 47306

This study analyzes responses of boaters in Northwest Michigan to determine whether owners of boats with overnight accommodations use the boats the way that non-boating recreationists use summer cottages. Use as a summer cottage is defined as a minimum of living aboard the boat for two weeks and several weekends during each summer. The study area consists of four towns in Northwest Michigan, on Lake Michigan or Traverse Bay. All have marinas for recreational boats. In two of the marinas (Beaver Island and Charlevoix) dock spaces are mainly reserved for transient boats. In the other two (Suttons Bay and Elk Rapids) spaces are largely devoted to seasonal slipholders. All marinas in the study are publicly owned.

Data was gathered by questionnaire survey, administered in person at three of the marinas, and by mail at the fourth, during the summer of 1989. A total of 255 power and sailboat owners were surveyed. Type and number of facilities on board were counted. Data were collected on duration of use, number of users, size of boat, home port, and residence and age of owner.

Most owners stated that they used their boats as vacation homes. All who did fit the definition, and many exceeded it greatly. The data were analyzed according to size of boat, facilities, use, number of users, and means of propulsion.

AN EVAPOTRANSPIRATION-INTERCEPTION MODEL FOR URBAN AREAS by S. Grimmond* & T.R. Oke, Atmospheric Science Programme, Department of Geography, The University of British Columbia, Vancouver, B.C., Canada, V6T 1W5 [* Present address: Department of Geography, Indiana University, Bloomington, Indiana, 47405]

This paper presents a model to calculate evapotranspiration from urban areas over a wide range of meteorological conditions. Because it is necessary to cope with the changing water availability on the surface, during and following rainfall or irrigation, an evapotranspiration-interception approach is used. The model is applicable to areas the size of city blocks to land-use zones and time periods of one hour or longer.

The modelled evaporation is compared with that from micrometeorological measurements conducted from January to June 1987 in a suburb of Vancouver, B.C., Canada. The results show this approach to modelling urban evapotranspiration provides realistic hourly and daily estimates of the areally-averaged latent heat flux and surface water state.

DENDROCLIMATIC RECONSTRUCTION OF DROUGHT FOR NORTH-CENTRAL GEORGIA, 1825-1986 by Henri D. Grissino-Mayer, Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ, 85721.

Widths of individual rings from 80 increment cores from 30 dominant/codominant shortleaf pine (*Pinus echinata* Mill.) growing in three proximal sites near Athens, Georgia, were measured and crossdated using established dendrochronological techniques. Earlywood and latewood widths were measured separately. Autocorrelation resulting from biological persistence was removed by fitting autoregressive processes to each ring series to develop a white noise residual chronology each for earlywood (EW), latewood (LW), and total ring widths (TW) spanning 1825-1986. The LW chronology exhibited a much higher sensitivity than either the EW or TW chronologies, and displayed much higher correlations with monthly temperature, precipitation, z-indices, PDSI, and PHDI data for the north-central Georgia climate division. However, the EW chronology showed significant ($p < 0.05$) correlations with climate during the preceding winter and spring months while the LW chronology exhibited higher correlations during the late summer and early fall months, indicating a greater availability of climatic information when ring width is separated into its two constituent parts. A calibration period spanning 1926-1985 and verification period from 1895-1925 were used to reconstruct prewhitened monthly PDSI and PHDI values during late summer and early fall to augment the historical climate data after applying proper regression diagnostic techniques. Results indicate severe droughts ($< -2.0\ \sigma$ about the mean) occurred during 1830, 1841, 1865, 1925, and 1986, with 1986 being the worst during the last 120 years. Periodicities of 10.3 and 27.5 years were also discovered in the chronologies indicating the possibility of an exogenous forcing mechanism acting upon tree growth.

THE GIS AS A DATA INTEGRATOR IN CULTURAL/HISTORICAL GEOGRAPHY

by Janet Gritzner, South Dakota State University, Brookings, South Dakota 57007

This paper explores the uses of the computerized geographic information system (GIS) in cultural/historical geography. A GIS is a structured approach to collecting, archiving, manipulating, and storing spatially referenced information. It is a useful tool for environmental assessment, geographic modeling, and for data integration. As a data integrator, a GIS provides the locational framework to temporally link cultural and natural resource information. As a demonstration, a GIS is developed for a test site on Crow Creek and Lower Brule Reservations in South Dakota. Large scale maps dating from 1892 to 1966 and historic documentation provide information on the character of the changing physical and cultural landscape of the Big Bend of the Missouri River. The 1892 Missouri River Commission Maps contain detailed information on the settlement and farming patterns on the Big Bend reservations. The 1947 War Department maps depict the area some fifty years later and prior to the completion of the Missouri River dams. Contemporary USGS 7.5 minute quadrangle maps show the same area after the building of the dams and filling of the reservoirs. From these sources, nine separate map layers are prepared for the GIS; these include land use/land cover; trails, roads and ferry crossings; and buildings and structures for three dates. These data are registered and transformed into a ground coordinate system to support comparative analysis and to allow locational information from non-map sources to be integrated into the database. Example investigations include changing settlement patterns and land use.

SMALL SCALE MAP ANALYSIS WITH ARC/INFO

by Richard E. Groop, Dept. of Geography, Michigan State University, East Lansing, MI 48824.

Most applications of GIS technology use large scale, "topographic type" data for display and analysis. This poster gives examples of small scale, "thematic type" mapping using data for the entire state of Michigan. Various point, line, and area data layers are superimposed and analyzed with ARC/Info.

Coverage layers include census data for counties and MCDs; 5-digit zip code areas; USGS DLG data at 1:2,000,000 (including lakes, rivers, roads, and other features); state highway travel time zones; and USGS GNIS data.

Results demonstrate the analytic potential of combining socio-economic and physical data and of applying GIS technology to small scale mapping.

SATELLITE REMOTE SENSING IN ASSESSMENT OF SURFACE ENVIRONMENTAL IMPACTS OF OIL AND GAS ACTIVITIES

by Sally Gros, University of Oklahoma, Norman, Oklahoma 73019

Surface environmental impacts of old and recent oil and gas wells and pipelines are of concern to many government and private agencies in Oklahoma. To date, however, there has been an absence of research in the scientific literature focused on these impacts. This study examines the extent to which Landsat thematic mapper (TM) data and Landsat multi-spectral scanner (MSS) data can be used to assess surface environmental impacts of oil and gas activities and begin to fill this gap. The rich history of oil and gas activities in Seminole County, Oklahoma provides a case study from which to assess the environmental impacts using the different satellite imagery.

Results indicate that Landsat TM data is more useful in identifying surface impacts than Landsat MSS data because of its higher spectral and spatial resolution. Several limitations with the TM data, however, were encountered. While visual interpretation of surface impacts can be enhanced using radiometric techniques, the data is not at a scale that can be used to identify plot or ground level detail. Utilizing a GIS in which the Landsat data represents one of many map themes can be an effective way to improve the ability to assess the surface impacts associated with oil activities at a 30 m scale.

BANANAS, CROPS, AND COWS: AGRICULTURAL CHANGE IN ST. VINCENT.

by Larry Grossman, Department of Geography,
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061.

For the past 30 years, bananas have been the leading export crop in the Caribbean island of St. Vincent. Bananas now dominate the agricultural landscape in much of the island and the acreage devoted to the crop continues to expand. Peasant households cultivating less than five acres are responsible for most of the output. As banana production has increased, declines have occurred in peasant cultivation of traditional food crops and in the raising of livestock. The contribution of banana growing to these changes is considered in light of models of conflict between subsistence and commodity production. Although increases in banana production have affected traditional agricultural activities, the impacts are complex and changes in traditional crop and livestock patterns cannot be attributed solely to the banana industry. Government policies concerning trade, declines in traditional export markets, new forms of agricultural technology, and changing dietary practices have all had significant influences on these patterns.

FLASH FLOODING IN THE UNITED STATES: TOWARD A COMPREHENSIVE ASSESSMENT

by Eve Gruntfest, University of Colorado, Colorado Springs, Colorado 80933-7150.

Flash floods are responsible for the majority of the flooding deaths in the U.S. Federal policies are more appropriate for slow rise flooding than for flash floods. Many rapidly urbanizing areas are vulnerable to flash flooding and the existing legislation and research findings do not directly address flash floods. As part of a project sponsored by the National Science Foundation, this paper examines the distinctions between flash flooding and slow rise flooding, discusses the relative merits of the popular adjustment warning systems to reduce flash flood losses, and identifies communities which can be considered success stories.

More than 65 flash flood experts participated in a survey to develop a definition of flash floods and to locate communities which are doing an exemplary job of flash flood mitigation. Survey results are presented. Recommendations are made for policy shifts at the local, state and federal levels to account for flash flood hazards and to mitigate losses.

THE EMPTY CEMETERY: MORPHOLOGICAL ASPECTS OF CEMETERY DEVELOPMENT IN QUEBEC CITY

by L. Guay, C.R.A.D., 1624 F.-A. Savard, Université Laval, Sainte-Foy, Québec G1K 7P4.

The morphological development of cemeteries in Quebec City, since the 17th century has given rise to three types of burying grounds: the urban open cemetery (before 1855), the suburban garden cemetery (1855-1970), and the peripheral park-cemetery (after 1970). Structural analysis reveals that this evolution was influenced, in succession, by the ecclesiastical nobility, the 19th century merchant class and, finally, the private sector, each succeeding in its own way to effectively advocate a new type of cemetery morphology by transforming the anthropological significance assigned to death. Each generation of cemetery is thus distinguished from the other by its morphology, its relation with space and with the economy. Cemeteries are evolving more and more toward abstract and organized forms and, in the process, stimulate for reasons of heritage, interest in the 19th century garden cemetery.

A.H. CLARK AND THE IDEA OF HISTORICAL GEOGRAPHY by Leonard Guelke, Department of Geography, University of Waterloo, Waterloo, Ontario N2L 3G1.

In the period 1945-1975 A.H. Clark made an important contribution to the development of historical geography as a distinct subfield of the discipline in North America. Harold Innis, Griffith Taylor, Carl Sauer and Richard Hartshorne influenced his thinking and writing. In the 1950s Clark sought to integrate the ideas of Sauer and Hartshorne in the concept of "geographical change through time" and applied this concept in his book Three Centuries and the Island: A Historical Geography of Settlement and Agriculture in Prince Edward Island. This work failed to provide a usable model for historical geographical study and Clark modified it in his later work. Although Clark was successful in promoting historical geography as a potentially valuable subfield of geography, he did not escape from the materialist (natural history) philosophies that dominated geographical thinking in his time. Clark's historical geography was characterized by a strong empirical orientation and a major concern with external manifestations of change. He understood that historical geography must be concerned with change and time, but his idea of historical geography lacked a criterion of historical significance. In the spirit of his mentors Clark gave little attention to the possibilities of a nonmaterialist philosophy of history and missed an opportunity of giving his concept of "geographical change" a stronger historical and intellectual basis.

DIFFERENTIAL URBAN GROWTH AND THE POPULATION REDISTRIBUTION: The S.Paulo state case- by, Odeibler S.Guidugli, University of State of S.Paulo- 13.500, Rio Claro-SP-BRAZIL.

The questions related to the spatial distribution of population are growing rapdly. As consequence many different scientists (mainly the planers and the geographers) and local Governments are becoming worried with the implementation of plans to get a better kind of development. Nowadays, in Brazil and particularly in the S.Paulo state, the respatialization of the population become in a dramatic situation in the two last decades. The population of the state grew approximately 250% between 1940-1980, meanwhile the the urban growth was 600%. In the same period, the metropolitan population of S.Paulo increased in a rapid way (1495%), and the isolated growth of S.Paulo city was 3080%. In the last decade this differential kind of growth began to be registered in many countries areas of the state. Simultaneously we had had a populational decline (relative and absolute) wich involves a significant number of cities and the majority of the area of the state.This research considered the identification of the process and the differential concentration of population in urban areas as a crucial and practical subject. The tendecies evaluated registered a trajectory wich will produce, rapidly more differentiation in the next futur. The S.Paulo state is been submited by a ambiguous model of development. We need a new project of development wich must to reflect the importance of the middle but emphaticaly the little cities to produce a better social and spatial future .

THE STATE, NGO'S AND REFUGEE ASSISSTANCE: THE CASE OF DADE COUNTY, FLORIDA by, Brian Gullatta, Geography, University of Kentucky, Lexington, KY 40505-0027.

The protection of refugees is an international issue shrouded in a complex array of social, political and economic factors. From the moment these people arrive in a selected country of asylum, they are faced with the bureaucratic apparatus of the state. How does the state approach the classification of these displaced individuals and, moreover, under what conditions does the state deem it appropriate to provide services to meet the basic needs of the refugees? What is the role of non-governmental organizations (NGO's) both as providers of services and as communication links between the refugees and the state?

This paper examines the settlement process of refugees as it is affected by political agendas of the state and the actions of NGO's. A case study of the Roman Catholic Church in the Miami-Dade County metropolitan area is used to comprehend the interplay between the impact of refugees on a local community, the response of a concerned NGO, and the immigration policies defined by the state. An historical and contemporary analysis of the response of the Catholic Church to successive waves of refugees from Cuba, Haiti and Nicaragua is paralleled with an evaluation of relevant changes in U.S. foreign and immigration policies in order to make apparent the political context within which an NGO is confined in the provision of services to refugees. Results of the study suggest that regionally specific problems with regard to refugee settlement may be best ameliorated through dialogue between NGO's already involved locally and the state immigration and foreign policy apparatus.

SOUTHERN NATIONALISM ON THE LANDSCAPE: COUNTY NAMES IN EX-CONFEDERATE STATES by Harold E. Gulley, Department of Geography, University of Wisconsin--Oshkosh, Oshkosh, Wisconsin 54901.

A recent study noted a lack of mainstream American nationalism on the landscape of states in the Deep South. The Confederate period and the celebration of the Lost Cause offer a possible alternative form of nationalism within the former Confederate states. Evidence of this distinct form of nationalism would be expected to appear on the landscape within this region.

This preliminary examination of evidence of southern nationalism on the landscape evaluates the importance of this component of southern culture. The focus of the investigation is on county names derived from prominent southern nationalists, Confederate soldiers and politicians, and wartime governors. The significance of historical period is tested by determining dates at which counties were established and by comparing results among the various states. Examining the frequency of county names of southern nationalist origin increases the ability to gauge the significance of the findings.

Results indicate that approximately six percent of all southern counties have names linked to southern nationalism. Individual state figures range from eleven percent to zero, indicating an array of sentiments toward this period in southern history, as naming of landscape features is but one of a number of forms of commemoration.

BENCHMARKING GEOGRAPHIC INFORMATION SYSTEMS by S.C. Guptill, U.S. Geological Survey, 521 National Center, Reston, VA 22092

Geographic information systems (GIS) are emerging as the spatial data handling tools of choice for solving complex geographic problems. In response to rapidly growing demands, a number of GIS solutions are being marketed. However, how should a prospective user of GIS technology choose from among the systems being offered?

Benchmarking is a testing process in which computer systems such as a GIS are tested for functionality and performance. A series of benchmark scenarios, that is a precise sequence of operations and functions, can help a prospective GIS user evaluate the aspects of a system that are appropriate for his application.

Example benchmark scenarios for various GIS functions were prepared. These scenarios were executed, utilizing a standardized set of test data, on a number of both vector- and raster-based GIS packages using a variety of hardware platforms. The results reflect the system's ability to perform a given function, the amount of time to execute it, and the accuracy of the results as compared to other tested systems.

THE IMPORTANCE OF LANDSCAPE FOR REGIONAL DEVELOPMENT by G. Gustafsson, Department of Geography, University of Karlstad, Box 9501, S-65009 Karlstad, Sweden

The aim of the presentation is to examine the ways in which the landscape is important for both local residents and tourists at the global level. The research is mainly theoretical in nature but some interviews and picture tests are included.

Results suggest that the importance of the landscape lies in a spectrum ranging from a landscape which one identifies with and which is part of one's inner being to a physical landscape. The research conducted so far shows that cultural factors and interest groups play a major role. It is difficult to distinquish any landscape preferences which are objectively all-embracing or valid for all time. In this context various strategies for regional development are discussed, from attempting to reinforce local identity to using the landscape to increase tourism in an area. In the later case, it is essential to decide which cultures or groups of individuals one wishes to attract, or vice versa whether a certain landscape is only interesting to certain potential tourists. Different ambitions have different impacts on regional development and may been seen in the light of top-down and bottom-up strategies. Further, the landscape's relative importance in relation to local living conditons and total production/significance of tourism must be taken into account. The paper also examines the influence of the media in a mass society and what effects this may have in standardizing our landscape preferances. Although the work is mainly concerned with rural areas, some assessment is made of the landscape value of urban areas as regards regional development.

ENERGY BALANCE INVESTIGATION OF SEASONAL SNOWMELT, MORMON MOUNTAIN, ARIZONA by Bruce L. Gwilliam, Arizona State University, Tempe, Arizona, 85287.

Energy and water balance measurements were collected periodically during snow year 1989 at the US Soil Conservation Service Snow Telemetry site, Mormon Mountain, Arizona. The site is located on the southern aspect of the mountain under a Ponderosa Pine, Gamble Oak canopy cover. Six sample hydro-microclimatological runs were conducted between early January until the last snow in March. Observations were taken at fifteen minute periods throughout each diurnal cycle. Measured variables include temperature, wind speed, and relative humidity at two levels (50 and 100 cm) above the snow surface. Temperature was measured at two levels in the snow and at four levels in the soil; soil moisture was recorded at three levels within the soil.

This paper focuses on delineation of energy balance components and their relationship to snow-water loss. Dominant influences upon snowmelt are identified as net radiation and ground heat flux.

SPOT IMAGERY FOR URBAN-RURAL DELINEATION: A CASE STUDY by Barry Haack and Susan Jampoler, George Mason University, Geography Program, Fairfax, Virginia 22030

A major concern in the Kathmandu Valley, Nepal is the rapid urbanization of prime agricultural land. To develop strategies to control this problem requires information on the rate and location of change with respect to other factors such as soil type, slope, and transportation routes. The purpose of this study was to map the urban areas of the valley using multidate SPOT imagery and incorporate that data layer into an existing Geographic Information System.

The Kathmandu Valley is a complicated landscape. There were several significant issues which had to be considered in utilizing the SPOT imagery: 1) the cropping patterns are very complex, 2) the slopes of the valley create shadowing effects, 3) the density of urban expansion is varied, and 4) spectral patterns from the buildings are not consistent as the roofing materials are changing from traditional thatch and clay to metal or concrete.

Mapping of urbanized areas in this complicated area is possible using SPOT visual data. However, aerial photography can provide much more detailed land cover analysis, often at an equivalent cost.

CHARACTERISTICS OF SUBSISTENCE POACHING IN SWAZILAND by Jeffrey D. Hackel, Geography Dept., California State University, San Bernardino, California 92407.

Subsistence level poaching in Swaziland's northeastern nature reserves is a problem, with a large proportion of the nature conservation budget going to combat it. Therefore, it is worthwhile to examine who is poaching and why they do it.

Police arrest and conviction records for a four year period (Sept. 1980 - Aug. 1984) were analyzed to determine poacher characteristics, and if a seasonal pattern existed. Tape recorded interviews with game rangers and rural people living near Swaziland's northeastern reserves supplemented the analysis of these records.

Findings show the average poacher to be a 36 year old male seeking wildebeest or impala. If caught poaching, he has an 88% chance of being convicted; after which he would be fined $60 or, alternatively, have to spend 125 days in jail. There were, however, a wide range in penalties, with no apparent relationship between the penalty and the number of times a person was caught. Furthermore, while poaching increased significantly in the winter (dry) months, it did not increase from month to month during this period as was expected. This contradicts the common idea that people poach more as the dry season progresses.

People poach because they do not consider it to be stealing. For most people game is communal property to which they should have access.

ARTIFICIAL WETLANDS: ENVIRONMENT AS FANTASY IN URBAN DEVELOPMENT by Stephen M. Hackney, California State University, Chico 95929.

Two hundred years ago California was endowed with over 800,000 acres of wetlands. Today there are fewer than 80,000 acres. There yet remains the threat from agricultural encroachement, suburban sprawl, and poisoning from an assortment of toxic wastes.

In recognizing the loss of such a valuable resource, various local, state and federal agencies have taken steps to preserve and restore California's remaining wetlands. This study looks at the City of South Lake Tahoe's attempt to create artificial wetlands within their broader redevelopment plan. What makes this wetlands project significant is that it will be a showcase with national and international implications.

Lake Tahoe is a national treasure. The City of South Lake Tahoe, in creating these wetlands, hopes to preserve and improve the quality of the Lake, as well as combine commercial development with environmental improvements.

This study looks at the processes which have led to the development of these artificial wetlands. Are the purposes of the planners at odds with nature? What are the potential problems between nature and humans? Will this concept - artificial wetlands in an urban environment - succeed?

STAND RESPONSE TO REPEATED INSECT DISTURBANCE IN THE MONTANE FORESTS OF ROCKY MOUNTAIN NATIONAL PARK by Keith S. Hadley, University of Colorado, Boulder, Colorado 80309.

Since the late 1930s, the montane forests of Rocky Mountain National Park have experienced repeated outbreaks of western spruce budworm and Douglas-fir bark beetle. In this study I examine the effects of these disturbances on stand structure, radial growth of host and non-host tree species, and succession.

Recent budworm outbreaks have greatly increased the mortality of Douglas-fir seedlings, saplings, and suppressed trees thereby favoring seedling and sapling survival of non-host, seral pines. Subsequent bark beetle outbreaks cause high mortality among larger (>10 cm dbh) subcanopy and canopy individuals.

Moderate to large decreases in radial growth among Engelmann spruce and Douglas-fir are evident during budworm outbreaks. Small or no radial growth increase by non-host pines is associated with budworm outbreaks whereas subsequent beetle outbreaks elicit moderate to large growth increases.

The net effect of the combined disturbances is a slowing of the replacement of seral pine by the more shade-tolerant Douglas-fir. Repeated budworm outbreaks have replaced fire as the disturbance agent ensuring the persistence of pines since the initiation of fire suppression in the early 1900s. Moreover, Douglas-fir bark beetle has eliminated many of the survivors of earlier budworm outbreaks and fire thereby shifting the dominance of these remnant stands towards pine.

THE SPATIAL IMPLICATIONS OF RESTRUCTURING IN THE GLASS CONTAINER INDUSTRY by Mark R. Hafen, University of South Florida, Tampa, Florida 33620.

Since 1979, the American glass container manufacturing industry has undergone extensive change. As the market for consumer glass containers has declined relative to other packaging, and as input costs have risen, the industry has been forced to consolidate and restructure to remain viable. Responses by individual firms within the industry have varied, yet the end results have been consistent--plants have closed and jobs have been lost.

This paper identifies some of the conditions that led to the restructuring in the glass industry, including factors within the industry itself and changes in other sectors of the economy. Particular attention is paid to various firm structures and characteristics and to how these have influenced spatial distribution of glass container manufacturing. Results of the restructuring are then analyzed, specifically the reduction in the number of producing firms, plant closings, and subsequent employment loss.

Finally, the analysis will be used to project further actions in the industry, as well as to discuss any implications there might be for other industries.

FARMING THE FOREST: MANAGING PEOPLE AND TREES IN THAILAND'S RESERVED FORESTS by James A. Hafner, Department of Geography, University of Massachusetts at Amherst, Amherst, Massachusetts 01003

The rapid depletion of forest resources in the humid and sub-humid tropics of the less developed world poses a series of complex problems for planners and resource managers. In the last quarter century Thailand's forests have declined by 60% due to poor management, encroachment by poor and landless farmers, and illegal logging. To counter these forces the government has enlarged areas under protective reserved forest legislation, strengthened court and police authority to prosecute violators of forest and land codes, and promoted new forest management programs. A key strategy in these programs has been the granting of certificates of use to degraded areas of reserved forest. This paper examines the use of this policy in the Forest Village and STK programs in NE Thailand.

The implementation of this policy has seriously compromised the success of these two programs in the Dong Mun reserved forest. Government grants of amnesty to illegal forest dwellers in 1975 prompted large-scale immigration, created demand for farm land in excess of areas alienated for this purpose, and resulted in conflicts over de jure and de facto land rights. Project guidelines limiting land allotments to 2.4 ha. per household have been inadequate to meet basic subsistence needs, created social and economic inequalities within and between project villages, and forced unqualified households to encroach on reserved forest or land set aside for reforestation. Many of these problems have resulted from failures to correctly assess population-land pressures in the northeast, modify program design to fit community needs and capabilities, and to insure that project benefits are distributed equitably.

Key Words: Deforestation, forest management, certificate of use, N.E. Thailand.

Header Title: Managing Reserved Forests in NE Thailand.

THE DACHSTEIN-TAUERN REGION: PART OF THE EUROPEAN PLAYGROUND by Wolfgang Haider, Carleton University, Ottawa, Ontario, K1S 5B6.

The Dachstein-Tauern region in Styria, Austria, serves as a good example for the dynamics associated with tourism development in alpine regions. Over the past 40 years this region changed from a peripheral agrarian economy to one that is now well integrated into, and dependent on, the international economic system.

Tourism statistics for the demand side (visitor arrivals by country of origin and season) as well as for the supply side (accommodation by category) reflect these changes well. Time series for the period 1955-88 will be used to analyze the development on two different scales. Firstly, the regional growth of tourist arrivals will be compared to the performance of the tourism sector on a national scale. This comparison will document the increasing importance of foreign visitors and the reaction of the supply side by improving the tourism infrastructure and quality of accommodations. Secondly, analysis within the region will reveal that the nucleus of development is the regional center of Schladming, while the more peripheral communities initially benefit from high season overflows only, but consolidate their development in later stages.

SPECULATIVE INVESTMENTS IN THE BUILT ENVIRONMENT: THE CASE OF REAL ESTATE INVESTMENT FUNDS by Anne Haila, Institute of Real Estate, Helsinki University of Technology, Otakaari 1, 01250 Espoo, Finland.

It is characteristic of investments in land and property that there is a great variety of different types of investors and investment motives. Examples of investors are home builders, financial institutions, state and speculators. Examples of motives are use value, annual rental income, or capital gain. One distinctive type of investor is the speculator, whose behavior can be characterized as follows. The aim of investments is land rent, in the form of rental income or as capitalized into price. Rent is sought continuously, not only at times when there are no investment opportunities in the productive sector. The concrete product is what can be called abstract floor space not flats, offices, or factories, but floor space that can flexibly be converted from one use into another. Professionals of real estate business calculate the maximum rents and make decisions on the most efficient use of space.

The agents, par excellence, of the speculator type are real estate investment funds. In the paper I attempt to answer the following questions: What is the influence of these funds on real estate prices and rents? What is their impact on the use and supply of floor space? Have the manoeuvres of these funds replaced the coordination of the use of space by public authorities and by the kind of market mechanism that allocates land to different uses according to rent-paying ability. In other words, do these funds introduce a new mode of coordinating urban land use?

A REASSESSMENT OF MENNONITE AGRICULTURE IN BELIZE CENTRAL AMERICA by J. Hall, Wilfrid Laurier University, Waterloo, Ontario N2L 3C5.

Forty years ago, a group of Mennonite farmers from the Canadian Prairies migrated to Belize Central America to find a new life. Several years of church supported trial and error farming eventually led to a commercial corn, kidney bean, and livestock operation. In 1970 this author investigated the development, problems, costs and productivity of this transplanted agricultural system. Interviews and questionaires were administered to a random sample of one hundred farmers to investigate the influence of cultural factors on agrarian behaviour and land use. Cost-factor analysis and Cobb-Douglas production functions based on field data were employed to estimate resource use efficiency. The results of the survey disclosed that the Mennonite farmers' agricultural production of field crops was very efficient, but cultural constraints reduced total farm production to marginal levels.

The purpose of this study, twenty-years later, was to reassess the agricultural production and resource use efficiency. Interviews, and questionaires were administered to a similar-sized random sample of farmers. Cost factor production functions were employed to estimate production and resource use efficiency.

The results of the reassessment illustrate a pronounced decrease in committment to farming and an increase in out-migration from the colony.

PLANNING FOR REGIONAL SHOPPING CENTRES : CONTRASTING CANADA AND THE UK. by A.G. Hallsworth , Department of Geography, Portsmouth Polytechnic, Portsmouth, UK.

Under Thatcherism, the last decade has seen the UK moving strongly towards " free market" economic policies. One might assume that this would be reflected in decisions in respect of innovative shopping developments. If the UK is prepared to pass major utilities from public to private ownership to an extent not matched in most Western democracies, then surely the activities of private entrepreneurial organisations are likely to be unfettered.

This paper examines the extent to which the "free market" has overtaken UK retailing by comparing outcomes in Ontario, Canada, with those in Hampshire, UK.

Recent decisions in the context of the UK seem, contrary to expectations, to be less "liberal" than those found in the Canadian case-study area. Attention is therefore paid both to the function of planning as an activity and the political implications of retail decision-making.

It is suggested that there may be "pork-barrel" geopolitical influences on outcomes. Likewise, planning in the UK can be seen as both legitimating and "objectifying" decisions that are, at root, political. It is further argued that planning constraint in favour of established locations carries with it implications for investment and other long-term financial decisions and may in fact be a crucial "prop" to certain property interests.

CULTURAL VALUES, HOUSEHOLD STRUCTURE AND HOUSING NEEDS: CANADIAN INDIAN PEOPLE by Evelyn Peters and Greg Halseth, Department of Geography, Queen's University, Kingston, Ontario, K7L 3N6

There is relatively little demographic work available on the effect of ethnicity on household structure. Yet anthropological studies suggest that family values are important influences on decisions about household membership. A number of researchers indicate that ethics of collectivism, cultural norms regarding sharing and child-rearing, and a high value placed on family life, are realized in North American Indian household composition. As a result, Indian households are more likely to be extended or multi-family, and there are fewer non-family households in the Indian than in the Non-Indian population. These differences would affect the housing needs of the Indian population. Few comparisons of Indian and Non-Indian household structure are available, however, especially comparisons which control for factors such as age, income and location which may also affect household structure.

This study employs the 1981 Canadian Special Census of the Native peoples to compare Indian and Non-Indian household structure. The study controls for location, size of settlement, and income. Data on age of household head are not available but the demographic structure of Indian and Non-Indian populations in particular locations will be examined. Implications for housing needs are explored by way of conclusion.

HYPERCONCENTRATION EFFECTS IN THE DELIVERY OF SEDIMENT TO A FIRST-ORDER CATCHMENT, LOESS PLATEAU, CHINA by H. Hamilton and S.H. Luk, Department of Geography, Erindale Campus, University of Toronto, Canada L5L 1C6

The Loess Plateau region of North China is known for its high erosion rates. In 1987 and 1988, a program of field monitoring was conducted in a small experimental basin in Yangdaogou, Lishi County, with the objective of assessing the relation of these high erosion rates to the mechanisms of sediment delivery to a first-order channel. In the 12.64 ha experimental basin, water discharge and sediment concentration were determined at a Parshall flume during 17 runoff producing events over the two-year period. During these events, a mean sediment concentration of 505 g L^{-1} was observed. Sedigraph analysis indicated that on the recession limb, sediment concentrations can remain above 500 g L^{-1} even after water discharge fell below 10 L s^{-1}. This appears to indicate a hyperconcentration effect that acts to keep large amounts of sediment in suspension over a range of discharge values. Individual events may exhibit clockwise or counter-clockwise hysteresis effects, depending on the time since the previous event and rainfall characteristics of the event. These results suggest that for many events, hillslope erosion is an important sediment source. The hyperconcentration effect may be used to explain the high sediment delivery ratio in the Loess Plateau often cited in the literature.

FIELD MEASUREMENT OF AEOLIAN SEDIMENT CONTRIBUTIONS TO LAKE POWELL, UTAH by Janet Drake Hamilton, Department of Geography, University of Minnesota, Minneapolis, MN 55455.

Lake and reservoir water quality models include estimates of inputs derived from the watershed, but often assume these contributions to be waterborne. In the case of lakes in arid or semiarid watersheds, however, windborne influxes can not be ignored. Field measurement of aeolian sediment transport into Lake Powell, Utah, for a series of storm events provided a means to calibrate estimates of erosion derived from the Wind Erosion Equation. Relative influences of storm characteristics, grazing intensity, and level of off-road vehicle use are also determined.

CLASSIFYING GENTRIFIED NEIGHBORHOODS by Daniel J. Hammel, University of Minnesota, Minneapolis, MN 55455.

Gentrification is an often used, but nebulous word. It has been described as being a complex process with a single cause, a chaotic concept, and many things in between. Clearly, it is a term that encompasses a number of seemingly distinct, but possibly related processes. Empirical investigations of these processes need to be better ordered, if they are to prove useful. This paper attempts to provide a process based framework for grouping gentrified areas into similar classes. The actors (current and previous residents, developers, speculators, facilitators etc.) the method and source of financing, and the production of gentrifiable housing are considered.

Evaluation of Photographic Scales and Wetland Classification Using a GIS Analysis of Lower San Francisco Bay by Lawrence R. Handley, U.S. Fish and Wildlife Service National Wetlands Research Center, Slidell, Louisiana 70458

In 1984, the U.S. Fish and Wildlife Service and the Environmental Protection Agency initiated a study to map habitats of San Francisco Bay estuary. The study area consisted of 104 1:24,000 scale habitat maps using U.S. Geological Survey quadrangles. The maps depict wetlands and land-use categories for uplands. This paper will present an analysis of wetland change for the lower San Francisco Bay area for the 1976 habitat maps for south San Francisco Bay at several levels of habitat classification and compare those analyses with the same levels of classification for the mid-1950's and 1985 habitat dates. This will help habitat map users understand the limitations placed on detailed wetland mapping by photographic scale.

The lower San Francisco Bay is comprised of 18 quads for the three dates. These maps were digitized and have been analyzed at the National Wetlands Research Center of the FWS using a Geographic Information System(GIS) based on the Map Overlay and Statistical System (MOSS) software.

In the course of the GIS analysis of this project, problems were encountered as a result of the varying scales of the photographs. The 1976 1:130,000 scale produced data have definite limitations in their use when compared to the 1956 and 1985 photos and data. Some habitat types such as estuarine intertidal, non-vegetated and not diked, estuarine emergent and not diked, showed acreage decreases between 1956 and 1976, then habitat acreage increases between 1976 and 1985 which were not real.

INDUSTRIAL RESTRUCTURING AND EMPLOYMENT IN CITIES SINCE THE 1960's by R. Hanham, Geography Program, West Virginia University, Morgantown, West Virginia 26506.

The manufacturing boom which followed the Second World War in the U.S. ended soon after 1965 when the rate of profit began to fall. This decline was primarily due to gains made by labor at the expense of private sector business interests and to an increase in international competition in product markets. A number of strategies were subsequently used by manufacturing businesses to turn profit rates around or, at the very least, slow their decline down. Three of the most important of these strategies are geographic investment restructuring, productivity improvement and further intensification of the labor process. All three had an impact, whether it be direct or indirect, on the demand for labor. The result, as we now know, was a substantial reduction in the employment of manufacturing production workers, although the severity of the change has been geographically varied. This paper assesses the relative impact of these three strategies on manufacturing production employment in more than ninety metropolitan areas throughout the traditional manufacturing belt of the Midwest and the newly industrialized Southeast during the period from the 1960s to the 1980s. The results indicate that although there are differences in the relative importance of these strategies among cities within these two broad regions, the largest differences occur between the two regions. Reasons for these differences are examined.

THE DYNAMICS OF IMMIGRATION SETTLEMENT PROCESSES AND POSSIBLE IMPACTS ON INTERNAL MIGRATION SYSTEMS by Michael Hannan, Department of Business & Economics, Edinboro University of Pennsylvania, Edinboro PA, and Robert Walker, Department of Geography, Florida State University, Tallahassee, Fl.

Immigration settlement patterns are examined within a pooled cross-section time-series framework. Trends in settlement patterns from 1970 to 1979 differentiate the immigration streams from various source areas. Certain "new" immigrants show an increasing propensity to concentrate, while immigrants from traditional source areas deconcentrate in some cases. The analysis suggests that immigration is a dynamic process with characteristics and determinants that change over time. A formulation of the expansion method is proposed for investigating the impact of settlement processes on domestic migration systems.

MAGNITUDE, TIMING, AND CAUSE OF CHANGE WITHIN A FOREST ECOTONE by K. Hansen-Bristow, W. Wyckoff, and J. Benfield, Montana State University, Bozeman, Montana 59717

Biogeographic changes along the lower forest-grassland ecotone of the Madison Valley of southwestern Montana, were studied to assess their nature, timing, causes, and magnitude. Trees now occupy large areas that were once grasslands. A minimum of 22% (9,498 hectares) of the potentially invadable grasslands along the forest border have been invaded by trees since 1947. The area is a belt of important grazing/browsing lands for both domestic livestock and wildlife. Vegetative changes within the ecotone include an increase in sagebrush downslope, a large number of diseased and dying trees, numerous small trees, and a large fuel build-up on the forest floor.

Tree cores were collected to determine growth rates and tree ages. Results indicate that a fairly high degree of variability in growth rates occurs, and a range of potential germination dates must therefore be assigned to individual trees. Nevertheless, the data indicate multiple periods of significant biogeographic change. These changes were compared with livestock grazing patterns, fire activity and climatic records. If the changes are considered to be induced unnaturally, management may consider tree elimination through burning to return parts of the ecotone within Wilderness areas to a more natural state.

BASAL SLIDING IN A THREE-DIMENSIONAL MODEL OF STORGLACIÄREN, SWEDEN by Brian Hanson, Department of Geography, University of Delaware, Newark, Delaware 19716.

The response of glaciers and ice sheets to climatic temperature changes contributes a considerable uncertainty to our understanding of environmental change. The response of the cryosphere to warming is only partly in the form of direct melting. Increased flow of ice to lower elevations via changes in basal melting and basal sliding will also lead to a loss of ice mass. We cannot predict these changes, as we hardly understand their role in the force balances of current glaciers.

The present study uses Storglaciären, a small valley glacier in the Kebnekaise massif of northern Sweden, as a test case for three-dimensional finite-element simulations of velocity under various assumptions about basal sliding. The relative quality of simulated velocities compared to the data available provides an indicator of the quality of several different sliding laws. Sensitivity studies using perturbations in sliding-law parameters provide an estimate of the importance of these effects in the response of the glacier to environmental changes.

ENVIRONMENTAL HAZARDS IN BANGLADESH: CAUSES, CONSEQUENCES, AND ADJUSTMENTS TO 1988 FLOOD by C. Haque, Ryerson Polytechnical Institute, 350 Victoria Street, Toronto, Ontario, Canada M5B 2K3, and A. Rahman, Bangladesh Institute of Development Studies, E-17 Agargaon, Sher-e-Bangla Nagar, Dhaka, Bangladesh.

Flood has always been a part of life to Bangladeshi farmers; it provided the necessary alluvium for their fields throughout historical periods. However, the recent floods, particularly of 1987 and 1988, have indicated a phenomenal increase in hazard loss. This study examines: i) the causes of abnormal floods in Bangladesh, ii) the changing nature and magnitude of hazard impact, and iii) provides some policy guidelines relating to riverine hazard management issues

Bases on a national field survey in 1988, the study found that the piecemeal intervention in natural ecosystem of Bengal by structural-engineering schemes, phenomenal population growth and consequent stress on land, and the prevailing socioeconomic inequality were the principal factors in influencing the aggravated hazard loss.

Finally, it is suggested that, in the Bangladesh context, a relatively efficient resource and environmental policy requires an integration between physical and socioeconomic spheres.

DIFFERENCES IN RUNOFF AND SEDIMENT PRODUCTION WITHIN AN ANDEAN WATERSHED by Carol Harden, Department of Geography, University of Tennessee, Knoxville, Tennessee 37996.

Rainfall simulation experiments and field observations were used to compare the erodibility of 105 sites in the 3,176 km^2 Rio Paute (Ecuador) watershed. Soil response to rainfall was found to differ more within soil units (mapped at 1:50,000) than between units. In some instances, replicated trials of simulated rainfall demonstrated a high level of variability within the same small field. Generally, land use was found to be better than soil type as a predictor of erosion. 75% of recently plowed fields were found to have very high infiltration rates, whereas runoff was more readily generated on mature fields and fallow land. Due to intensive grazing and a high clay content of most of the soils, pasture land typically had very low infiltration capacity. Although pasture runoff carries negligible sediment, runoff generated in pastures, pathways, and roadways was seen to play an important role in eroding soils in the plowed areas and in delivering sediment to the fluvial system.

LAWS OF NATURE: ENVIRONMENTAL LEGISLATION IN COLONIAL VIRGINIA, 1619-1776 by David S. Hardin, University of Maryland, College Park, Maryland 20742.

Colonial Virginia is often portrayed as an exploitative society bent on economic profits at all cost. Virginians of the time are viewed as either ignorant of or unconcerned with their relationship with their fragile natural environment. Certainly, Virginia's political economy encouraged the exploitation of natural and human resources, but the relationship between the colony and nature was less monolithic than has been previously suggested. In fact, there were many legislative initiatives instituted by the colony that were thoughtfully designed to preserve and even encourage certain species of animals adversely affected by human activity.

The purpose of this paper is to examine the types of legislation created in Virginia from 1619 to 1776 that related to the suppression and/or encouragement of wildlife. Hening's Statutes at Large were examined for their environmental content. Individual acts were abstracted and categorized according to the species and approaches involved. Temporal, spatial, and thematic patterns were then observed. Particular attention was paid to the legislation designed to encourage deer and fish populations and eradicate wolves, crows, and squirrels.

Conclusions drawn from this study point toward deliberate and inadvertent human actions as catalysts for the growth or decline of animal populations and the creation of attendant legislation. Deliberate actions tended to reduce economically important animal resources such as deer and fish, leading to the need for protective legislation. Inadvertent actions--usually in the form of habitat modifications--encouraged population increases among undesirable species like wolves, crows, and squirrels, resulting in the need for legislation designed to suppress such "pests." Although their responses were frequently piecemeal and often amounted to little more than damage control, Virginians nonetheless remained flexible and creative in their legislative efforts to deal with their environment.

THE RELIGIOUS GEOGRAPHY OF RUSSIAN PENTECOSTALS IN THE AMERICAN WEST by Susan Wiley Hardwick, California State University, Chico 95929.

Glasnost, perestroika, and other recent policies permitting emigration have allowed thousands of Soviet emigrés to migrate to the United States. Preliminary investigation in California and Oregon documents a distinct spatial pattern of varying religious and ethnic groups, including Russian Jewish emigres, and Orthodox, Baptist, and Pentecostal believers. Of particular interest in this study are Russian Pentecostals. Of the 36,000 Soviet citizens who emigrated into this country during the past year, several thousand members of this charismatic and fundamentalist Protestant denomination have settled in the American West. In Oregon, Russian Pentecostals are the state's third largest refugee group.

The study examines not only the settlement patterns of Russian Pentecostals in the western United States but also investigates their conversion within the context of atheistic twentieth century Soviet society and the rapid diffusion of converts from Ukrainian villages to as far east as Vladivostock.

Of particular interest are the processes which have resulted in distinct Russian Pentecostal enclaves in the United States in the early 1990s. The existence of mediating institutions such as antecedent Russian Protestant churches as well as an established network of relief organizations and social services have strongly influenced the settlement patterns of this religious group in the American West.

COMPLEXITY, LIVING SYSTEMS, AND HUMAN GEOGRAPHY by Walter G. Hardwick, Dept. of Geography, University of British Columbia, Vancouver, V6T 1W5, Canada

In the 1980s the literatures of complexity, open systems, non-equilibrium thermodynamics, and self-organisation have produced a body of philosophical and scientific thought which addresses and illuminates traditional geographic concern over process inherent in the genesis of place. It also offers an intellectual framework which permits the many debates within geography to be put into a coherent framework. A living systems approach, as applied in the life sciences, is intrinsically historical in contrasts to hypothetical-deductive positivism. Living systems are self-organization and dissipative, drawing energy, information, and material from the enveloping environment to the teleological ends of life sustenance.

The paper argues that those geographers who choose a place or region as an entity for study, recognise boundedness, initial conditions, and are principally concerned with the processes of growth and transformation meet the conditions of living systems analysis. Examples are drawn from the works of a number of human geographers as evidence to support the argument.

REFLECTIONS ON THE CLIMATES OF THE GEOLOGICAL PAST by F. Kenneth Hare, University of Toronto, Toronto, Ontario M5S 1A1.

A remarkable phenomenon of the earth's climate is that it has remained relatively stable throughout much of geological time. The relevance of the Gaia hypothesis to climatic stability over millions of years will be discussed.

WARMING TRENDS RESULTING FROM THE GREENHOUSE EFFECT: FACT VERSUS PERCEPTION by John M. Harlin, Department of Geography, University of Alabama, Tuscaloosa, Alabama, 35487.

Annual and seasonal temperatures were analyzed for the South and Southeastern United States. A strong warming trend was noted from 1850 to 1935 in each state. However, cooling trends were noted to begin in 1935 to 1940 and continue to the present. These trends are in agreement with trends in continental United States and Alaska. The cooling trend underway since 1935 was subjected to Fourier transform, curvilinear regression, and linear regression. The cooling trend for each climatic division in Alabama (with the exception of the Gulf) is linear, and significant at the 0.0001 level. The strongest cooling trend is found in the Upper Plains with F-value of 100.33. A telephone survey was conducted on 100 professionals (Full-professors, Doctors, and Attorneys) in the Upper Plains region. The mean age of the respondents was 50, with age ranging from 30 to 67. Mean time of residence was 32 years, with a range from 16 to 67 years. Ninety-seven percent of the respondents had heard of the Greenhouse Effect and ninety-five percent of the respondents noted a significant warming trend during the past two to four decades--citing the cause as the Greenhouse Effect.

SYNOPTIC CLIMATOLOGY: THEMES, APPLICATIONS, AND PROSPECTS by J.R. Harman and J.A. Winkler, Department of Geography, Michigan State University, East Lansing, MI 48824-1115.

Synoptic climatological research has a long and varied tradition within the discipline of geography. This paper is an attempt to inventory the themes and applications that have historically characterized synoptic climatology as presented in geographic outlets and to distill their broadly unifying attributes. We then summarise the underlying themes of contemporary synoptic climatology from our perspective and suggest possible applications appropriate for geographic inquiry.

THE SPATIAL STRUCTURE OF NEWSPAPER CIRCULATION FIELDS by John E. Harmon, Central Connecticut State University, New Britain, CT 06050

The geographic reach of Sunday newspapers is arguably the best single measure of metropolitan influence fields. An investigation of recent newspaper circulation data for large metropolitan Sunday newspapers reveals an apparent hierarchy of national, regional, state and metropolitan newspapers but there is only occasional dominance of the national and regional newspapers over metropolitan newspapers. True dominance, the ability to force competitors out of the market, exists principally within metropolitan regions. Same day publication and distribution of national newspapers is possible with current publication technology, but only a few general newspapers have ventured into the national market and their penetration is still light. While certain regional newspapers have traditionally been regarded as dominant within large spheres of influence, circulation data show that the core of the metropolitan region still accounts for most circulation. The perceived dominance of certain regional newspapers is probably due to their penetration into the households of the socially and economically elite. Most of the circulation is still in a relatively large number of metropolitan newspapers whose circulation regions are small and bounded by the location of competitors and, in some cases, state borders. Examination of newspapers circulation fields shows that each metropolitan "community of interest" is still rather small. The spatial structure of the U.S. urban system is more like a large set of partially overlapping metropolitan influence spheres than a structured hierachy where larger centers dominate smaller ones.

GUAYULE: RUBBER FROM THE DESERT by Vern Harnapp, The University of Akron, Akron, Ohio 44325.

In 1910, about 10 percent of the world's rubber and half the rubber used in the U.S. were supplied by guayule, a small shrub native to the Sonoran and Chihuahuan deserts of Mexico and the southwestern United States. As a source of natural rubber it has since been replaced by hevea brasiliensis. With a rise in the use of natural rubber, a projected shortage, and the cost or scarcity of petroleum have meant that guayule is set for a comeback.

Renewed interest and funding on the part of the federal government and research provided by Firestone-Bridgestone Rubber Company point to a restart of rubber production from guayule. This new industry centered on five million acres in Texas, southern Arizona, and southwestern New Mexico could eliminate the need for imported natural rubber. It would also be an economic boom to depressed Indian reservations in those states.

This study traces the history of guayule from Aztec use through the Emergency Rubber Project of World War II. It then resumes with current plans for modern cultivation and processing of guayule rubber. A new aspect of agriculture could be added to the deserts of the southwest U.S. and northwestern Mexico in the near future.

CONSIDERATIONS IN THE USE OF GIS TO ASSESS FORESTRY OPERATIONS IN CALIFORNIA by D. E. Harper, Department of Geography, University of Victoria, P.O. Box 1700, Victoria, B. C. Canada, V8W 2Y2.

The California Department of Forestry and Fire Protection (CDF) authorized preparation of a pilot study of the application of geographic information system (GIS) technology to forest management and the assessment of cumulative effects of logging. The project was conducted in the Mendocino Ranger Unit on the Big River basin in north-coastal California, a redwood and Douglas fir harvesting area. The pilot GIS, prepared by VESTRA Resources of Redding, California, used existing information from CDF and other agencies to store and process timber harvest plan (THP) data and provide reconnaissance-level identification of areas prone to surface erosion, landslides, and sedimentation of streams.

GIS has immediate value for tracking THPs, producing map overlays, and improving efficiency of THP review. The further application of GIS to forest management and impact assessment requires resolution of both scientific and socio-political issues. Improved algorithms to describe watershed functioning should be linked with the routine collection of relevant field information on watershed conditions and forestry practices. Improved modeling of sediment generation and routing, and understanding of impacts of logging on fish, wildlife, and site productivity are needed. In addition to hardware acquisition and data capture costs, field personnel would require GIS training. Data should be carefully managed for quality and security. Political uncertainty surrounding the value of cumulative effects assessment limits the allocation of funds necessary for technical work. Although GIS can contribute to improved forest management, expectations that GIS can avert political and judicial intervention in CDF and industry operations will likely prove unrealistic.

A COMPARATIVE GEOGRAPHICAL ANALYSIS OF DRUG- AND NON-DRUG-RELATED HOMICIDES IN THE UNITED STATES, 1976-1983 by K. Harries, University of Maryland Baltimore County, Baltimore, MD 21228.

The purpose of this paper is to investigate homicide incidents in order to characterize crimes, victims, and offenders in their geographical and ecological settings and determine whether drug-related homicides form a distinct class on the basis of regional distribution and other characteristics, compared to non-drug-related incidents. Data are drawn from the Supplementary Homicide Reports of the Federal Bureau of Investigation for the years 1976-1983, with an underlying incident count of 155,267. From this eight year total, all drug-related cases with codes indicating "felony-type" homicides ("narcotics and drug laws") and "other than felony-type" ("brawl due to influence of narcotics") were abstracted. Some 3,113 such drug-related homicides became the data base for the present analysis. Of these, some 2,500 were of the felony-type.

Points of comparison include victim and offender age, race, and sex; weapon, victim-offender relationship, and circumstance. These attributes are reviewed in the context of their status as felony/nonfelony and by region of occurrence, classified as South or non-South.

DETERMINANTS OF INTERNATIONAL INVOLVEMENT BY COMMERCIAL BANKS by James W. Harrington, Jr., Department of Geography, University at Buffalo, Buffalo NY 14260.

Size of parent bank and desired market segment have been found to be the greatest determinants of foreign operations (number and type) of commercial banks. In the Canada-US context, this relationship is complicated by the two economies' proximity, intensive interaction, and the regulatory changes included in the Canada-US Free Trade Agreement. This paper uses interviews and published statistics to note the influence that proximity, ultimate ownership, and market segmentation have on banks' decisions to engage in correspondent relationships versus agencies, branches, and subsidiaries across the border. The paper also explores relationships between existing bank strengths and FTA-related actions.

THE ARIZONA MONSOON IN A WARMER WORLD by John A. Harrington, Jr. Department of Geography & Geology, Indiana State University, Terre Haute, Indiana 47809.

Synoptic scale impacts of global warming induced by increased tropospheric levels of CO_2 and other trace gases are difficult to decipher from the output of GCMs. However, regional scenarios for conditions in a warmer world can be constructed by contrasting relatively warm and cold periods from the historic data record (Wigley et al., 1986). TenHarkel's (1980) Raininess Index for the Arizona Monsoon was analyzed using four scenarios for the period 1901-1960 (Palutikof et al., 1984). Relatively warm and cold years are defined using first a polar temperature data set and then the northern hemisphere surface temperature record of Jones et al. (1982). Different scenarios tested contrast the individual coldest and warmest years from the data record whereas other scenarios contrast the warmest and coldest ten or twenty consecutive year periods. The Raininess Index is the percentage of stations that receive measurable precipitation on any given day and, thus, provides a spatial measure of the intensity of the Arizona Monsoon. Results of the scenario analyses converge and indicate a smaller average Raininess Index during warmer periods. Biogeographic and water supply implications of these results are discussed.

LANDS FOR RESEARCH: THE CASE OF NEW MEXICO by L.M.B. Harrington, Department of Geography, Central Michigan University, Mt. Pleasant, Michigan 48859.

Land use and the landscapes human beings create are of long-standing interest to geographers. Most attention is placed on a variety of urban and traditional rural landscapes/land uses. This paper will demonstrate the widespread nature of research as an 'alternative' rural land use, using a single state as an example. New Mexico has seen a significant amount of land put into research use. Over three percent of the state's land area is designated for research. Lands designated and used for research in the state include US Department of Agriculture, US Department of the Interior, military, state/university, and private areas. The significance of research as a land use in New Mexico is shown by the large number of areas used for research purposes, the variety of research activities in these areas, and the proportion of the state designated for research purposes. Recognition of research as a land use is not strong, but research has taken up significant areas of land, with potential effects on local economies and national scientific development in a number of areas.

ATMOSPHERIC CHEMISTRY TRENDS IN RALEIGH/DURHAM by J. Harris, Department of Geography, North Carolina Central University and H. Williams, Department of Geography, North Carolina Central University, Durham, North Carolna 27707.

This study examines trends in precipitation chemistry in the Raleigh/Durham metropolitan area of North Carolina. Weekly National Atmospheric Deposition Program data are analyzed for a nine year period, 1979-1988. It is hypothesized that linear relationships exists between acidity, calcium, sodium, chloride, sulfate, nitrate and precipitation over time. Pearson correlation coefficients are used to determine the associations between the variables for the nine year period. A plot of the ratios of sulfate to nitrate over time indicate no significate relative change between the two gases. Coefficients reveal a strong direct association between sulfate and nitrate, two anthropogenic elements associated with burning fossil fuels. Sulfate is also found to be highly associated with calcium.

Data are also analyzed for the summer and winter seasons. The coefficients for calcium and sulfate are relatively high for both summer and winter. When the ratios of sulfate to nitrate are correlated with sulfate and nitrate, an inverse relationship between nitrate and the ratio is revealed during the winter months. This resulted from a decrease in sulfate with respect to nitrate during the winter months. Sodium and chloride and sodium and magnesium are highly correlated during the winter months, suggesting the marine influence on atmospheric chemistry. The amount of precipitation is found to be inversely related to calcium, sulfate and nitrate, supporting the notion of washout and/or rain-out.

THE RESHAPING OF EUROPE IN NORTH AMERICAN SPACE

by
Cole Harris
Department of Geography
U.B.C.
Vancouver, B.C.
Canada V6T 1W5

European life could not be reassembled in North America as it had been in Europe because the geographical context of European ideas and institutions had been so fundamentally altered. This talk suggests some of the salient ways in which European life was bent in North American space and, in the process, alludes to the somewhat different evolution of Canadian and American societies.

THE CANADIAN ARCHIPELAGO AND THE BORDERLAND THESIS

by
Cole Harris
Department of Geography
U.B.C.
Vancouver, B.C.
Canada V6T 1W5

Although all Canadian regions are, to some extent, borderlands of adjacent American reigons, their emergance had more to do with the transcontinental expansion of trade and settlement across northern North America. In sum, therefore, they reflect less various peripheries of American empire than a distinctive European encounter with the New World, the background of the different societies on either side of the border today.

THE SOCIAL GEOGRAPHY OF THE NORTH AMERICAN CITY, 1900-1940: AN OVERVIEW AND REINTERPRETATION by Richard Harris, McMaster University, Hamilton, Ontario, L8S 4K1

Most accounts of the social geography of Canadian and US cities in the first half of this century emphasize inner city poverty and suburban affluence. Writers have supposed that only middle-income households could afford to live in new suburban homes and to commute to work downtown. In fact, both the patterns and processes of residential settlement were rather different from this. In particular, many blue-collar workers, including unskilled workers with low incomes, were settling in the suburbs. They were able to do so, in part, because industry was suburbanizing rapidly, even before the advent of the truck. In addition, workers' families substituted labour for cash by working upon and within their homes. Self-building, for example, played an important part in the work strategies and domestic economies of many workers. It enabled them to move to the suburban fringe and, thereby, to shape the social geography of the city in ways that have not been fully appreciated or understood.

This interpretation underscores the importance of viewing the home as a place of work, where women and men supplement and complement their wage incomes, although to varying degrees depending upon their social class, ethnicity and race.

SOIL EROSION PREDICTION AND CONSERVATION TARGETTING USING EXPERT SYSTEMS by T.M. Harris, West Virginia University, Morgantown, WV 26506, and J. Boardman, Brighton Polytechnic, Brighton, BN1 9PH, UK.

An expert system approach to soil loss risk assessment and for targetting conservation measures is demonstrated for the South Downs area of Sussex in the UK. A database of some 350 soil erosion events has been compiled for the area based on detailed field surveys undertaken over the past seven years. A rule tree is generated from this knowledge base using an induction based expert system. The rules are subsequently used to predict potential soil loss given postulated environmental conditions and farm management practices. The system is evaluated in terms of its ability to predict the occurrence and magnitude of potential soil erosion events.

Using the predictive capability of the system conservation measures to reduce the impact of possible soil erosion can be proposed and tested to determine their effectiveness. It is suggested that by chaining expert systems in this manner cost effective conservation measures can be identified and evaluated according to a variety of economic, environmental, and agricultural criteria.

AN ALLOCATION MODEL FOR CHANNELS DELIVERY OF CARGO AND PASSENGERS, Cheng Liu, Glen Harrison, and Becky Guinn, Oak Ridge National Laboratory, MS 6206 Building 4500N, Oak Ridge, TN 37831.

Channels are origin-destination pairs of stations that are served by a set of stable missions flown by the Air Force's Military Airlift Command (MAC) and commercial aircraft each month. Currently, there are about 760 channels and about 300 missions that are available to deliver cargo and passengers. The missions must visit specific destinations from specific origins a certain number of times each month to meet frequency requirements. MAC must satisfy these delivery and frequency demands within the available number of aircraft operating hours. If the delivery or frequency cannot be met by military aircraft, contract civilian aircraft are used.

An allocation model has been developed to allocate cargo and passengers to missions with the objective of minimizing shortfall at the origins and efficiently using the airlift resources available. This is a mixed integer programming problem. Because of the number of available missions and channels, the problem cannot be solved with branch and bound techniques using a workstation within a reasonable timeframe. A heuristic method has been developed to solve this problem. The solution determines the missions to fly, the number of times to fly, and the cargo and/or passengers moved.

DEREGULATING THE INFORMAL SECTOR: LOCAL STATE POLICY AND STREET TRADERS IN SOUTH AFRICA by D. M. Hart, Department of Geography and Regional Science, The George Washington University, Washington, D.C. 20052.

South Africa's sizable informal sector has been historically viewed by the state in a negative light. Past strategies have followed traditions exhibited elsewhere in which street traders are perceived to tarnish the image of a modern, orderly city. In South Africa, stringent government policies with respect to the informal sector have been linked to the desire to preserve urban space as a white domain. Recent 'reformist' policies espoused by central government have, however, accompanied an altered attitude towards hawkers. The national government has called for deregulation of the informal economy. Local authorities have been urged to act upon the directive and to implement accommodationist strategies within their jurisdictions. Municipal response has varied across the nation, with resistance to change most pronounced in intermediate and small towns. The overall portrait exposes a divorce between policies of the central and local state, with a prevailing reluctance on the part of municipal government to concede to the demands and needs of hawkers.

THE CHANGING FUNCTION OF SMALL TOWNS IN MINNESOTA by John Fraser Hart, Department of Geography, University of Minnesota, Minneapolis, MN 55455.

The central place network of Minnesota, and much of the Midwest as well, was established by the turn of the century. The population of individual incorporated places has grown in proportion to the growth of the entire urban system, and the principal function of places has changed. Retail and service activities have been shifting up the urban hierarchy from smaller to larger places, but employment in manufacturing has been trickling down the hierarchy from larger to smaller places. The central places that once served surrounding agricultural areas have become minor cogs in the national system of manufacturing centers. Attempts to revive retail and service activities in a fossilized system of central places appear doomed, but industry needs small towns as much as small towns need industry. Economic development efforts must be cognizant of the new realities of small incorporated places.

RURAL HOSPITAL UTILIZATION: WHO STAYS AND WHO GOES? by L. Gary Hart, Roger A. Rosenblatt, and Bruce A. Amundson, Department of Family Medicine, HQ-30, University of Washington, Seattle, Washington 98195

The role and survival of the rural hospital is a direct function of the way in which it is used and perceived by the community it serves. In order to gain insight into the factors that affect utilization of rural hospitals, households in the service areas of the six hospitals that participated in the WAMI Rural Hospital Project were surveyed. As part of the mail surveys, we asked people to tell us where they received both inpatient and outpatient medical care and their perceptions of and opinions about their local medical services.

The six communities are socioeconomically diverse, and their service areas range in population size from 3 to 25 thousand. Hospital market share – the proportion of all hospitalizations which occur in the local hospital – varies dramatically from one hospital to the next. Less affluent families, and those whose personal physician resides in the rural community, are much more likely to utilize their local hospital.

Because hospitalization is a relatively infrequent event, satisfaction was used to measure local perceptions of the community's hospital. Older residents and those with medical insurance had higher levels of satisfaction than their younger and uninsured counterparts. In addition, satisfaction with the local hospital facility was related to perceptions about the hospital's billing practices and emergency room. Feelings about the local physicians and hospital were intertwined.

Although attempts to increase rural hospital market share are dependent to a certain extent on the sociodemographic composition of the local community, there are some aspects of the rural health care systems that can be modified in the short term to increase satisfaction with local services and to increase the likelihood that residents will use local facilities. The most effective steps a community can take are to increase the proportion of residents with personal physicians residing in the local community and to increase the proportion of the population who are insured. In addition, ensuring that the emergency room is accessible and responsive and improving hospital billing practices are two concrete ways by which hospitals can project a better local image.

POSSIBLE PERIODICITY IN SUMMERTIME MAXIMUM TEMPERATURES AT SACRAMENTO, CALIFORNIA by Mark F. Hartman, Department of Geography, University of Nebraska-Lincoln, Lincoln, NE 68588-0135.

Sea breezes flowing through the Coast Range Mountains at the Carquinez Straits provide a natural air-conditioning system for the Central Valley of California during the summer. Interested observers have noted what seems to be a cycle of events. Maximum daily temperatures become a few degrees higher over each of successive days. The last few days are the hottest with highs peaking in the range from 95°F to 105°F+. After several very hot days in succession, sea breezes begin to flow. These breezes can cause a considerable reduction in daily maximum temperatures, and the stage seems to be set for a repeat of the alleged cycle.

Power spectrum analysis was utilized to determine if there was periodicity in daily maximum temperatures in Sacramento, California during the summer seasons from 1979 to 1988. Although none of the power spectra were found to be significant at the 95% confidence level for red noise, a majority of the summers studied did display a notable peak in spectral power at a period of approximately ten days.

Summer seasons displaying a peak in spectral power in the range from 8 days to 12 days were analyzed to determine the synoptic-scale conditions that might be associated with the noted periodicity. Included in the discussion will be the major surface and, where appropriate, upper level atmospheric conditions that contribute to the heat-wave-buildup sea-breeze-cool-off cycle.

LOW BUDGET SHORTCUTS TO HIGH TECHNOLOGY: SOME APPLICATIONS OF MACINTOSH COMPUTERS FOR UNDERGRADUATE CARTOGRAPHIC INSTRUCTION by Sean Hartnett, University of Wisconsin - Eau Claire, Eau Claire, WI 54701

Computer mapping has made some significant inroads in undergraduate cartographic instruction in the 1980's. Much of this advance is attributable to the development of powerful personal computers and sophisticated software. While most of the popular mapping and GIS programs such as Atlas*Graphics, ArcInfo and MapInfo operate in the PC compatible environment, there are a few noteworthy programs available for Macintosh computers. Besides these specialized mapping applications, the Macintosh environment also provides a great variety of opportunities for cartographic instruction often at just a fraction of the cost of more traditional approaches. A Macintosh computer configured with a laser printer provides an efficient system for producing map lettering. Tapping the user-friendly Mac environment, even students who have never used a computer can easily generate lettering of differing size, fonts and form. For map construction, an assortment of postscript graphics programs may also be utilized to produce high quality maps in both bit-mapped and object oriented formats. Students who lack programing skills may also use Hypercard to develop interactive atlases. Lastly, Macintosh II computers offer undergraduate students a valuable introduction to color definition and the generation of color overlays and separations.

THE POTENTIAL ROLE OF HYDROGEN FUEL IN ALLEVIATING THE BUILDUP OF GREENHOUSE GASES by L. D. Danny Harvey, Department of Geography, University of Toronto, 100 St. George Street, Toronto, Canada, M5S 1A1

This paper provides a synopsis of a detailed techno-economic appraisal of hydrogen fuel prepared for the Intergovernmental Panel on Climatic Change (IPCC). The most promising near-term (10-20 years) techniques for large scale non-fossil fuel production of hydrogen involve conventional and advanced alkaline electrolysis using photovoltaic power, with high temperature water vapour electrolysis a longer term possibility which promises higher conversion efficiency from sunlight to hydrogen. If hydrogen is used as a means of storing electricity, maximizing overall system efficiency requires that when hydrogen is reconverted back to electricity it is to be done as part of cogeneration or district heating, which implies small scale, decentralized electricity generation. Within the transportation sector, hydrogen is a promising fuel for commercial aircraft, rail, bus, and truck transport, but there are major unresolved problems pertaining to onboard storage in automotive applications. Alternatives to hydrogen in automobiles include ammonia and methanol. Since some fossil fuels are likely to be used for many decades, in spite of concerns about the greenhouse effect, one option is to manufacture methanol using non-fossil fuel derived hydrogen and CO_2 captured from fossil fuel powered fuel cells, from which capture of CO_2 would be relatively easy and inexpensive.

HISTORICAL RECRUITMENT OF BLUE OAK POPULATIONS IN SOUTHERN CALIFORNIA, by L. Edward Harvey, University of California, Santa Barbara, CA, 93106, USA.

Seedling recruitment, age and size structure of blue oak (*Quercus douglasii*) populations are analyzed at two sites in southern California. Most blue oak mortality occurs in the first few years after acorn germination, but the mortality rate depends on the suite of predators present. The log-logistic survivorship function is fit to the proportion of individuals surviving over time in the presence of different predator combinations. These functions are used to calculate an expected age distribution for each stand. The expected age distributions are compared to observed distributions based on tree ring counts made at ground level. A time-series of the observed relative to predicted proportion of individuals in different age classes is compared with historical precipitation and grazing records. The observed recruitment histories are episodic but otherwise quite different at the two sites. At one site, a recent decline in observed versus expected recruitment is highly correlated with cattle grazing pressure and when cattle are present recruitment is unrelated to winter precipitation. In earlier years in the absence of cattle grazing, annual recruitment is highly positively correlated with annual winter precipitation.

THE MULTIPLE LISTING SERVICE AND REAL ESTATE MARKET ANALYSIS by Thomas Harvey, Department of Planning and Economic Development, Saint Paul, Minnesota 55102

Multiple Listing Services (MLS) offer a rich source of data for urban housing market research. MLS summary statistics include several key indicators of market trends including average price, median price, days on market, percent of listings sold, and ratio of sale price to list price. Annual and quarterly reports allow timely analysis. District averages can be supplemented with information on specific properties gathered from printed sales books or from MLS computer databases. In the Minneapolis-St. Paul metropolitan area, MLS data is available from the early 1970s. In 1988, area MLS offices merged to form a regional MLS, one of the largest in the country. The Twin Cities housing market has shown a dramatic shift since 1980. Many of the basic indicators -- most particularly annual appreciation -- show a recent market stability matching national trends. In a reversal of the 1970s market, Twin Cities suburbs are now faring much better than most inner-city districts. Days on market and percent of listings sold reveal weak markets for lower-priced housing and core city locations that are not immediately obvious from sale prices alone. This research examines the past two decades of housing market trends, then focuses on 1988 and 1989 data to analyze selected aspects of market averages. It is argued that broader use of MLS indicators provides a means to monitor neighborhood change.

TECHNOLOGY CHOICE, MATERIAL USE, AND PROSPECT FOR EMPLOYMENT IN THE BUILDING CONSTRUCTION SECTOR OF INDIA : AN ANALYTICAL PERSPECTIVE AND SOME POLICY ISSUES by Syed Abu Hasnath, Department of Geography, Boston University, 675 Commonwealth Avenue, Boston, MA 02215

This paper analyses the micro-economic aspects of building construction from a regional perspective. It presents the rational for, and procedures necessary to developing estimates of elasticity of substitution between technology and labor in the building construction sector of India. The factor demand model used in this paper assumes translog production function (TPF) and accounts for capital-deepening (labor-displacing) bias in the building sector. The analysis may provide some insights into how an appropriate building technology policy can be developed for various construction sites. The paper concludes that a greater and sober attention toward the choice of technology and use of construction material will yield a positive sum reward in terms of economic and employment opportunities.

SPATIAL AND TEMPORAL VARIABILITY IN PRECIPITATION OVER WESTERN NORTH AMERICA by Laura Haston and Joel Michaelsen, University of California, Santa Barbara, California 93106.

The purpose of this research was to study spatial and temporal variability in precipitation over western United States and relate this variability to variations in atmospheric circulation. We have assembled a precipitation data set for the region stretching west from the Continental Divide and north from Sinaloa, Mexico to Alaska. This data set covers the period 1948 to the present--a period for which data are available for a large number of stations. This allowed us to create a dense network of stations giving detailed coverage of the whole region.

The data set was analyzed using principal component and canonical correlation analysis. All data was aggregated into seasonal averages and statistical techniques were applied to each season separately to identify seasonally dependent patterns, season-to-season relationships, and anomaly patterns which progress over time. Analysis of this data set has enabled us to identify coherent patterns in precipitation over the region and relate these patterns to large-scale atmospheric circulation patterns. We have also determined the temporal characteristics of these spatial patterns and have compared temporal variations in precipitation to variations in the ocean and atmosphere on similar time-scales.

PERESTROYKA AND RESOURCE FRONTIER DEVELOPMENT by Gary Hausladen, Department of Geography, University of Nevada-Reno, Reno, Nevada 89557

During the Soviet period, decreasing resource production and increasing demands in the European USSR have led to an eastward shift in production and a greater emphasis on Siberian development. The decade of the 1970s has been characterized as particularly pro-Siberian. Major projects, such as Territorial-Production Complexes and the Baykal-Amur Mainline, helped to implement policies designed to exploit Siberia and further integrate this vast region into the Soviet economy. Recent attempts at economic reform as a result of Gorbachev's perestroyka promise to change this. This paper assesses the potential consequences of these reforms for the pattern and pace of resource frontier development, specifically in Soviet Siberia. Siberia's future will be linked to both domestic resource demands and integration into the world economy. Yet, far from representing a "turning away" from Siberian development, as some have suggested, perestroyka may simply be a continuation of traditional Russian and Soviet approaches to the exploitation and development of Siberia. These approaches have promulgated the basic colonial relationship between the European core and the Siberian periphery. Perestroyka may well intensify this relationship even further.

THE REGIONAL HISPANIZATION OF THE UNITED STATES; A CASE STUDY: LUBBOCK, AND LUBBOCK COUNTY, TEXAS, by T.W. HAVERLUK. University of Minnesota, Dept. of Geography, Social Science Building, Minneapolis, Minnesota, 55455.

From its beginnings as a lonely Quaker outpost come ranching heartland Lubbock has developed into an agricultural center specializing in cotton production, cotton oil mills and cotton ginning. Its phenomenal growth in the last four decades created a severe labor shortage that was primarily mitigated by the growing Hispanic population. Some research findings: 36% of all marriages in Lubbock county involve at least one Hispanic, and 10% of all marriages are between a Hispanic and a non-Hispanic; Hispanics now constitute 25% of the total population of Lubbock and 40% of the entire South Plains; Hispanics are not only growing arithmetically, but also geographically as Hispanics move into wealthier neighborhoods and up the social and economic ladder; a map of familial housing purchases over seven decades illustrates this expansion; growth from 1970 to 1980 would have been nearly zero without Hispanic growth.

LANDSCAPE PRESERVATION AT ANTIETAM by M. Hawkins, University of Florida, Gainesville, Florida, 32611.

In June 1989 residents of Washington County, Maryland protested vociferously against the adoption of a "buffer zone/overlay" plan by their county commissioners. The plan is intended to preserve the landscape surrounding Antietam National Battlefield Park. Reconciling modern land use with preservation of significant landscapes is a recognized problem in landscape studies. The controversy between preservationists and developers which occurred at Manassas in 1988 attracted national attention. The situation at Antietam differs in that the confrontation is between local residents and their own local government. The National Park Service and other "outside" groups have also been the targets of acrimony in Washington County. All parties involved claim to be in favor of preservation of the landscape.

This paper focuses on local population responses to the zoning plan. The genesis of the plan, and of the various "grass roots" organizations is reviewed. The role of "outside" organizations is discussed, as well. Analysis of reactions in opposition to the plan suggests that there are three motivating factors. First, local residents fear that their property rights will be confiscated or severely curtailed. Next, they feel that they have not been adequately consulted in the formation of the plan and that "outside" forces are at work to decide their fate. Finally, change threatens their way of life, both from development and preservation. Surveys and interviews, citizen review processes and public education should be the subjects of further research.

PUBLIC AGENCY MANAGEMENT OF URBAN LAND CONVERSION IN METROPOLITAN PHOENIX by D. Hawley, Arizona State University, Tempe, Arizona 85287

The urban land conversion process in growing metropolitan areas is subject to the supply of developable land. In Arizona, less than twenty precent of all land is privately held. This situation makes public (state and federal) land holding agencies of special interest to the study of urban land conversion. The Arizona State Land Department, by virtue of its mandate, is the public entity through which state lands are converted into urban and other uses. Although its policies are publically and self-regulated, the Arizona State Land Department provides a unique conjoining of public and private interests in the initial stages of the development process. Policy and case analyses of data from 1981 through 1989 demonstrate the degree to which this interdependency is present in land conversions and any biases, intended or not, present in the process.

HEALTHY COMMUNITY INDICATORS: THE PERILS OF THE SEARCH AND THE PAUCITY OF THE FIND by M.V.Hayes, Department of Geography, Simon Fraser University, Burnaby, B.C. V5A 1S6, and S. Manson Willms, School of Social Work and Centre for Human Settlements, University of British Columbia, Vancouver, B.C. V6T 1W5.

The Canadian Healthy Communities Project (CHCP) is an ambitious attempt to implement principles of health promotion and healthy public policy at the municipal level. The aim of CHCP is to foster local community organization and action around issues that threaten the well-being of local residents. To participate in the project, communities must be prepared to monitor and evaluate their progress using indicators that are relevant, sensitive, relatively easy to collect, and that will facilitate comparisons with other communities. The variety of local concerns that may be addressed within the CHCP framework, and the contextual dependence of relations involved in local issues, raise doubts about finding "one-size-fits-all" indicators. This paper addresses practical and theoretical questions about the role of indicators in CHCP.

VOLCANIC ASHFALL SIMULATION by Robert D. Hayes Jr., Indiana University of Pennsylvania, Indiana, Pennsylvania 15705.

The simulation is designed as a training aid for use primarily at the secondary school level. The program allows input variables for the amount of ejected material, wind direction, and wind speed. The simulation provides a visual display of ashfall patterns for various ash depths dependent upon the input variables. The user may select one of six output display modes: Ashfall Pattern over Grid and Map, Ashfall Pattern over Grid, Ashfall Pattern over Map, Grid and Map over Ashfall Pattern, Grid over Ashfall Pattern, and Map over Ashfall Pattern. The simulation allows estimation of area covered by ash at various depths.

Additionally, the program provides hard copy output of the display map(prior to simulation)which may be reproduced in order to allow students to practice computing and plotting ashfall patterns which may then be varified by the simulation. Teacher and student instructions may be visually displayed or printed for reproduction as needed.

GEO-FACTOR IN PUBLIC POLICY INFORMATION

by Kingsley E. Haynes
Dept. of Geography, Boston University, Boston, MA 02215

ABSTRACT

Obviously just as all public policy decisions generate winners and losers (see Robert Leone's Who Benefits) these winners and losers are usually not distributed randomly in space. Hence even without a national sensitivity to such spatial issues as balanced development, occupation of national territory or an appreciation of distributional equity there would be a concern for the spatial impact of public policy decisions. The surprise is not that the geo-factor exists but the many ways it is expressed and managed- explicitly and implicitly.

The basis of the geo-factor in the U. S. lies in the single seat electoral system and the political organization of representation on a territorial basis. Even when the territory is organized and reorganized (some would say gerrymandered) to respond to the "one person-one vote" constitutional requirement it is still explicitly territorial. Further, in the U. S. the regional aspect of popular representation is more territorial representative than popularly representative in the upper portion of the state and federal legislatures i.e. the Senate. In the U. S. Senate the territory of Wyoming has the same weight as the territory of New York even though the first Senator represents 250,000 people and the latter Senator represents 5 million people. As a consequence programs that subsidy sparsely settled regions have often been extensive, e.g., railroads, interstate highways and western water projects. Further, the ability of rural populations to dominate state legislatures has been embedded until recently in these fundamental geo-political factors.

To what degree are these observations about the geo-factor in U. S. public policy transferable to other national systems- federal vs. unitary - and do as such a characteristic play a particular role in heterogeneous national systems at particular times in their development. If we look at the Federal Republic of Germany, Canada and the potential European Federal System are there lessons to be learned?

OVERVIEW AND CRITIQUE OF THE NCGIA RESEARCH AGENDA

ABSTRACT

The NCGIA is a unique opportunity in geography and a special problem for the departments and universities that have undertaken the guidance of this program. However, rest assured, geography will not rise or fall on their success or failure even though some believe this to be the case. Success will not set the character of geography into the twenty-first century but it may contribute significantly to an important dimension of the field. As Burton noted in his comments on the end of the Quantitative Revolution- the revolution is over when it is widely and fundamentally incorporated in all teaching, training and research in the field. Oblivion will be the mark of success and successful incorporation into all aspects of geography should be one of the goals of the GIA portion of the National Center. To accomplish this two developments must occur. The first is the full dissemination of common tools and their incorporation into a wide range of research issues and topics. The second is the disappearance of GIS as a distinct form and methodology of analysis. The latter does not imply that methodological refinement of GIS will be complete but rather that interest in such refinement will be driven by substantive issues and the need to utilize and fit this material to specific kinds of problem solving.

Now how do we get from here (a bureaucratically written and funded Center) to there (an advancement in the fundamental stream of approaches to spatial research). Lessons are not to be found wholly within the discipline of geography because our federally funded center experience is too short and too narrow. Where can we look for guidance? My suggestion would to look at some of the long lived physics institutes or perhaps some of the National Laboratories. The first is the narrow basic research model of great scientific importance but socially ephemeral while the latter is broad ranging, political impacted, applications and development oriented. Both have characteristics of persistence and both took on lives far beyond those that they were originally created for. I don't have a model of the successful organization I described earlier but it is unlikely the Center will be able to do both successfully. However we have had some very important examples in geography of how a small field can be fundamentally impacted by research oriented training activity. These include the NSF summer workshops of the early 70's variety such as the Iowa Location-Allocation Workshop and alternatively the interdisciplinary sub-conference activity in the mathematical programming/location analysis mode of the Regional Science location analysis group. Both have been successful and on going generators of methodological advances in geography and the spatial sciences.

THE CANADIAN/US FREE TRADE AGREEMENT: IMPLICATIONS FOR THE CANADIAN LUMBER INDUSTRY by R. Hayter and E. Grass, Department of Geography, Simon Fraser University, Burnaby, British Columbia, Canada V5A 1S6

For Canada, a key aim of the Free Trade Agreement (FTA) with the US, which came into effect January 1, 1989, is to reduce, even circumvent, protectionist pressures within the US. The forest product industries, especially lumber, are central to this concern. Indeed, in 1985, in response to US claims that the Canadian lumber industry was taking advantage of subsidized stumpage rates to seriously damage American producers, the Canadian government imposed a 15% tax on lumber exports to prevent the US from erecting a punitive tariff barrier. Subsequently, the Canadian government argued that it was exactly this kind of dispute that justified the FTA. The FTA, however, does not replace existing US trade dispute procedures with a 'trade dispute panel' with binding powers of arbitration as the Canadian government had desired. Canadian lumber producers remain vunerable to the same protectionist measures as before and the export tax is likely to be removed only if stumpage rates are raised. Moreover, demand for lumber is growing slowly and Canada's market share in the US remains high.

This paper assesses the Canadian bargaining strategy regarding lumber exports to the US in the 1980s and the extent to which a combination of the export tax and/or high stumpage plus market saturation in the US have encouraged Canadian lumber producers to shift to offshore markets and a wider product-mix. That is, the paper considers whether or not Canada - US lumber trade disputes, and their 'resolution' in the FTA will herald a period of diminishing rather than increasing continental trade.

THE INTERNATIONAL FLOWS OF INDUSTRIAL EXPORTS FROM U.S. REGIONS by R. A. Erickson and D. J. Hayward, The Pennsylvania State University, University Park, PA 16802.

Foreign trade is increasingly regarded as an important factor in regional industrial restructuring and economic development. In the U. S., the individual states have expressed a growing demand for information on their respective foreign trade relations in order that trade promotion may be more effectively targeted and integrated into a broader development policy.

The U.S. Bureau of the Census has recently made available data on the origin of exports (where merchandise begins its export journey) by state, industry group, and country of destination. The recognized weaknesses with this shipments data may be obviated by integrating data on point of production from the recent Census of Manufactures for 1987. The resulting data comprise a set of trade flows from nine U.S. regions of production to each of up to 140 foreign destinations, and offer valuable insights into differences in states' and regions' industrial export patterns.

This data set was also used in the development of a extended spatial interaction model in which factors such as foreign trading blocs, perceptual trading-horizons and patterns of foreign direct investment ties in the U.S. were included with the market size (incomes) of the respective trading partners, their populations, and distances (reflecting transportation costs) between them. Separate analyses for each of the U.S. regions indicate variations in the relevance of the factors in different regions.

DEVELOPMENT OF RESTORATION TECHNIQUES FOR WEKIVA BASIN, FLORIDA by, Dr. Clarence M. Head, University of Central Florida, Orlando, FL, 32816.

In 1988 the State of Florida passed legislation to control and restrict development within much of the Wekiva River basin and to maintain it in a natural/pristine state. This basin is intended to serve as a model program for similar projects along Florida's major rivers.

Concurrently a 3 year research project was completed which assessed the effects of discharges into the stream from 3 wastewater treatment plants. This research project showed little relationship between stream nutrient concentration and the abundance of aquatic macrophytes in the stream; the project also determined that existing imbalances in aquatic flora and fauna resulted primarily from loss of canopy due to human activity.

Based on the above criteria this project was begun to develop techniques to restore the Little Wekiva River to a more "natural" state. In the initial phase a highly disturbed site was selected and the existing soil, hydrologic, and biologic conditions determined. The features of the disturbed site were then compared with "natural" sites of varying canopy levels. Observed site differences and the relationships to such physical factors as substrate quality, current velocity, water chemistry, and degree of shading are presented.

RECENT AMENITY DRIVEN DEVELOPMENT OF MINNESOTA LAKESHORE by Richard D. Hecock, Oklahoma State University, Stillwater, Oklahoma 74078.

Development is proceeding quite rapidly along many of the shores of lakes of Minnesota. Recent changes are of a character which is much different than lakeshore development of previous decades. Zoning restrictions, building codes, land prices, and taxes are among the factors which are responsible for these changes. So too are changing employment and retirement practices, as well as activities, motivations and preferences of lakeshore users.

Facilities, ownership and usage patterns of residential development are described for the lakeshore around a relatively remote lake in northern Minnesota in which most of the development has taken place since 1970. Characteristics vary considerably among the various units which comprise this development, but certain commonalties can be identified.

Current lakeshore development does not conform to old images in terms of facilities, ownership or use. Conventional appellations used to characterize lakeshore development, terms such as cottage, 2nd home, or vacation home, are insufficient or misleading. Moreover, in spite of its remoteness, permanent residents comprise a larger proportion of users, and very few of the permanent residents are retired. Occupants are drawn from a variety of socio-economic groups.

The findings presented here are placed in the context of amenity-driven development elsewhere.

GEOGRAPHY AND THE STRUCTURE OF ACADEMIC RESEARCH IN NINETEENTH-CENTURY FRANCE by M. J. Heffernan, Department of Geography, Loughborough University of Technology, Loughborough LE11 3TU, UK.

This paper examines the structure of state-sponsored academic research in France from the 1840s to 1914 based on the voluminous archives of the Commission des Missions Scientifiques et Littéraires This Commission was established within the French Ministry of Public Instruction to provide official funding for travel and research expenditure for individual French scholars. Many of the major figures in French intellectual life during the nineteenth century applied to this Commission for financial support. The thousands of dossiers scrutinized over the years by the Commission provide a unique insight into the French scientific community. More specifically, it is possible to analyse the nature, structure and evolution of French scholarly endeavour during this period, and examine the impact of the French state and the broader cultural and political preoccupations of France on academic research. The changing fortunes of different disciplines and research themes are discussed followed by a consideration of the shifting regional foci of French research around the world.

THE FINANCIAL IMPACT OF RETIREES ON RETIREMENT DESTINATION COUNTIES OF THE WESTERN UNITED STATES

by J. Hehr, Department of Geography, University of Arkansas, Fayetteville, Arkansas, 72701, C. Britton, Department of Economics University of Arkansas, Fayetteville, AR, 72701, and R. Ford, Dept. of Economics, University of Arkansas, Little Rock, AR, 72204

According to the United States Department of Agriculture, there are 273 counties located in the western United States that are designated as retirement locations. Retirement counties are particularly evident in the western states of Arizona, Arkansas, California, Missouri, New Mexico, Oklahoma, and Texas with other states participating to a lesser degree. The geographic proximity of water and public lands were found to be important factors in the retirement location decision of retirees into these rural areas. Certain of these rural counties now have economic development strategies which emphasize retirees as a major source of employment and income growth. Retirement as an industry is viewed as both an alternative to declining agriculture and as a diversification strategy to supplement other economic bases. Using bank data, we analyzed the impact of retirees upon the financial institutions of the retirement designated counties. The deposit growth and profitability of these institutions were compared with financial institutions of other locations.

THE LOCAL DEFENSE OF RESIDENTIAL SPACE: A CHALLENGE TO THE NATIONAL ENVIRONMENTAL AGENDA by Michael Heiman, Environmental Studies, Dickinson College, Carlisle PA 17013.

The recent emergence of broad-based local opposition to the siting of environmentally hazardous facilities in working-class communities presents the most profound challenge to the environmental agenda of the capitalist state since the original groundswell of middle-class concern during the late 1960s. The earlier movement was eventually coopted by a liberal reform agenda--crafted by capital interests-- which sought a negotiated settlement between support for expanded production space and protection of residential and recreational space against the negative externalities generated. Today, however, residents in residual "sacrifice" areas such as Niagara Falls NY, Robeson County NC, and Emelle Al, are uniting to reject a compromise solution to the siting impasse.

The tenacity of working-class defense of residential consumption areas may be understood by reference to the corresponding lack of control in the sphere of production. Short of structural change in ownership and control of the means of production, and a corresponding limit on production sufficient to stem the tide of hazardous byproducts, the grassroots opposition is expected to grow and to challenge the liberal reform agenda of state and federal governments, monopoly capital interests, and the Washington-based environmental organizations they recognize and support.

DEMOGRAPHIC CHARACTERISTICS OF EVACUEES VS NON-EVACUEES IN A POST-CHERNOBYL NUCLEAR POWER PLANT ACCIDENT SCENARIO by Catherine Horrall Helgeland, University of Wisconsin - Manitowoc County, 705 Viebahn Street, Manitowoc, Wisconsin 54220.

Soon after the Chernobyl Nuclear Power Plant accident in the Soviet Union, a random-digit dialed telephone survey of residents around the Point Beach and the Kewaunee Nuclear Plants in northeastern Wisconsin was conducted. The survey showed that residents' evacuation intentions differed significantly from the intentions of residents on pre-Chernobyl surveys. The current paper assesses the demographic characteristics of potential evacuees and compares those characteristics to characteristics of non-evacuees in this study as well as to those of evacuees from the Three Mile Island accident.

Demographic characteristics which are addressed include age, sex, occupation, marital status, and education level of the respondent as well as home ownership, household size, number of wage earners in the home, annual household income, number and ages of children in the home, the existence of handicapped members of the household, and the respondent's level of fear of nuclear plant accidents.

Demographic results are presented in graphic form, and the spatial distribution of evacuees vs. non-evacuees is mapped and assessed.

THE MYTH OF NATIONAL DEVELOPMENT by Nalani Hennayake, Department of Geography, Syracuse University, Syracuse New York 13244.

The way the concept of development has evolved in post-independent Sri Lanka is a good example to demonstrate that the idea of national development is more a myth than a reality. In a global context, we would, most often, think and act in terms of the notion of "national development". Yet, a close look at the historical evolution of the concept of development in Sri Lanka points out how this so-called national development is perceived merely in terms of the conception of the hegemonic ethnic group.

The language of development in Sri Lanka clearly includes western as well as indigenous notions of development containing a vocabulary which varies from an "adjustment to the world economy" to a "recapitulation of the glorious past". The critical point here is whose "glorious past" is referred to in the discourse of development. In this paper, I try to answer this question by examining the discourse of development and the nature of development policies pursued by various governments in post-independence Sri Lanka.

BETWEEN NATIONALISM AND SEPARATISM: AN ALTERNATIVE EXPLANATION OF ETHNIC SEPARATISM by Shantha K. Hennayake, Department of Geography, Syracuse University, Syracuse, New York 13244

Various theories have attempted to explain the emergence of ethnic separatism. Most of these theories appear to be too specific as they emphasize only one or a limited number of variables; some theories deal exclusively with cultural aspects while others focus on economic factors. In trying to explain the Tamil separatist movement in Sri Lanka, I found all of these theories inadequate and partial. This paper is thus an attempt to understand the emergence of Tamil separatism from an alternative theoretical perspective.

One of the most fundamental factors about ethnic separatism is that majority nationalism (nationalism of the dominant ethnic group) is an inherent component of it. Majority nationalism is most obvious when it takes the popular form. However, in many cases, it is disguised in the form of state policies. Most theories of separatism have not considered majority nationalism as a causal factor. The theory I outline in this paper treats majority nationalism as perhaps the most important causal factor. Such a theory of separatism also has the merit of mediating between cultural and material factors privileged by different theories of ethnic separatism.

THE UNITED STATES' DECADE FOR NATURAL DISASTER REDUCTION by Leaura Hennig, University of Colorado, Boulder, 80309.

"Throughout history, natural disasters have exacted a heavy toll of death and human suffering. . . . Accompanying the loss of life has been devastating economic loss and the hardships it entails for survivors." The United Nations and subsequently the U.S. House of Representatives and Senate declared the 1990s the International and the U.S. Decade for Natural Disaster Reduction, respectively, IDNDR and USDNDR.

This paper, a publication of the Natural Hazards Center of the University of Colorado at Boulder, summarizes possible directions of the USDNDR as defined by the participants of the 14th Annual Hazards Research and Applications Workshop, conducted in the summer of 1989. It describes the history of the USDNDR, while examining its prospects for success. It outlines goals for particular sectors (e.g., local, state, federal, Decade Committee) based on the insights of six hazards experts: Susan Tubbesing, Richard Hallgren, Philippe Boulle, Shirley Mattingly, William Hooke, and Walter Hays. Also, the paper synopsizes six concurrent workshops attended by 240 hazards specialists. The synopses indicate additional goals to be set, programs to be implemented, and agencies to be responsible for meeting these goals. The document concludes that although an initial lack of specific goals and projects for the USDNDR exists; the contribution for US natural disaster reduction may still be significant.

PUBLIC TRANSIT AND LAND DEVELOPMENT IN CLEVELAND'S DUAL HUB CORRIDOR by Linda S. Henrichsen, Cleveland City Planning Commission, 501 City Hall, Cleveland, Ohio 44114.

Seeking ways of improving public transportation and using it as a catalyst for promoting new commercial and residential development in the Dual Hub Corridor has been a major component of Cleveland's Civic Vision 2000 program. Current demand for public transportation is high in this five mile corridor between Greater Cleveland's two largest employment centers, Downtown and University Circle, even though substantial population losses and businesses closings have occurred in surrounding neighborhoods since 1960. Rail service is being proposed to serve the core of these two job hubs and a spine of institutions between them.

In evaluating transit improvements, Cleveland City Planning Commission saw the opportunity to attract new development to the Dual Hub Corridor. In Cleveland and other cities, higher densities of commercial and residential development have been concentrated at rail stations. To determine the potential of the corridor, a two part analysis was undertaken. First, stations in other cities were evaluated to determine the nature of development, its scale and zoning tradeoffs used to encourage higher densities and greater transit usage. Second, projections of office, retail and residential development along the corridor were made. To place projected development in the context the surrounding environment, proposed land use and sites along the corridor were evaluated to determine compatible uses and the scale of the existing urban fabric. These projections then were compared with Civic Vision forecasts of long term regional office, retail and residential market demand to ensure that development programs for station areas are realistic for Cleveland's economy as well as their immediate environment.

THE DIFFUSION OF THE MORMON SUBCULTURE INTO OTHER CULTURE AREAS by Roger L. Henrie, Department of Geography, Central Michigan University, Mount Pleasant, Michigan 48859

The existence of the Mormon Culture Region in the intermontane area of the United States has long been recognized. That region resulted not only from the well-known migration of the Mormon community from Illinois in the mid-nineteenth century, but more importantly from the doctrine of gathering. The doctrine of gathering brought tens of thousands of newly converted Mormons mainly from Europe and Anglo-America to the western gathering place. Since the beginning of the current century and especially since World War II, the doctrine of gathering to the culture region has been abandoned; members have been encouraged by church leaders to stay in their native areas and countries and build up local congregations. An extensive program of missionary work continues to increase the Mormon population in some regions of the world. In addition, a number of Mormons have migrated out of the traditional culture region, especially to areas in the United States. As a result of these factors, the Mormon subculture has diffused into other culture regions. This cultural diffusion especially is noticeable in parts of the United States which are outside of the traditional region, and in Latin American, the Polynesia, and the Philippines.

Rural Day Care: Needs Assessment for Economic Development by Norah F. Henry, Department of Geography, SUNY-Binghamton, Binghamton, NY

The ability to work outside the home is often influenced by the ability to secure reliable, affordable childcare. Most childcare studies focus on urban child care. In this paper we examine the needs for childcare in selected rural Pennsylvania counties. Employers, daycare centers and randomly selected rural households were interviewed to assess current use of various types of childcare, perceived need, and households' views of the importance of childcare when parents consider entering the labor market.

Here we emphasize the household survey portion of the study. We discuss current patterns of care, unmet needs for care and the costs (financial and distance) associated with childcare.

ARTIFICIAL NEURAL NETWORK PROCESSING OF SPATIAL REASONING TASKS by George F. Hepner, Department of Geography, Florida State University, Tallahassee, Fl 32306, and Niles D. Ritter, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109.

Recent research has indicated that an artificial neural network (ANN) maybe capable of several higher level spatial reasoning tasks essential to automated geographic information processing. This paper examines the potential for the application of neural network computing to satellite image processing. A second objective is to compare generalized land cover classification results for conventional supervised classification and ANN classification. An artificial neural network can be trained to do land cover classification of satellite imagery using selected sites representative of each class in a manner similar to conventional supervised classification. This research compares the use of an artificial neural network using a backward propagation "learning" procedure with a conventional supervised maximum likelihood classification procedure. Preliminary results indicate that the neural network is able to provide a land cover classification superior to the classification derived from conventional classification procedures. Classification is largely a function of set object transformations as are several other GIS operations, such as map decluttering and data fusion. This research, undertaken at the Jet Propulsion Laboratory, is the foundation for developing application parameters for further prototyping of software and hardware implementations of artificial neural networks in satellite image and geographic information processing.

MODELING GROCERY STORE POTENTIAL SALES: BEHAVIORAL AND NON-BEHAVIORAL APPROACHES by Thomas E. Herman, Department of Geography, SUNY-Binghamton, Binghamton, New York 13901.

Predicting sales in a market area is very important in the strategic planning of a retail chain. The purpose of this study is to predict the potential sales of a new grocery store as well as its effect on local competition by using behavioral and non-behavioral approaches.

The behavioral approach will involve a consumer/behavioral model to explain intended shopping behavior at a new Wagman's store. A telephone survey will be conducted to collect data concerning consumer intentions, as well as attitudinal variables including trust, loyalty, convenience, price, and certain demographic variables.

The non-behavioral approach will involve the use of a modified Huff model. The data used will include square footage, congestion/accessibility, distance, convenience/variety, price, and demographic variables.

There will be a two-stage analysis. First we compare the predicted sales of each method. Second, we use the attitudinal variables in the behavioral model to ascertain what they contribute to the explanation of sales behavior.

FROM RAG TRADE TO REAL ESTATE: LAND USE CONFLICTS IN NEW YORK'S GARMENT CENTER by Andrew Herod, Rutgers University, New Brunswick, NJ 08903.

The past two decades have witnessed the emergence of a number of "global cities" worldwide which have increasingly come to function as command posts for international capitalism. New York's recent economic renaissance has been concomitant with its emergence as one of the world's preeminent global cities. Declining blue-collar manufacturing and an expanded new professional elite, together with low-paid service jobs geared towards this elite, are heightening struggles over the future shape of New York's urban landscape. The Midtown section of Manhattan, the heart of New York's garment industry, has been a particular arena of conflict between real estate interests who wish to cash in on the office speculation resulting from the proposed Times Square Redevelopment Project, and small-scale garment manufacturers who fear that rising rents will force them to shut down.

Fears that spillover effects from the Times Square Redevelopment Project would increase real estate pressures, forcing manufacturers to relocate when their leases expired, led the City Planning Commission (under pressure from garment manufacturers and the International Ladies' Garment Workers' Union) to set up the Special Garment Center District in 1987. This provided for the preservation of floor space for garment manufacture. The rezoning was challenged by a number of real estate interests who argued that it unfairly limited real estate speculation in the area. Using this example of land use conflicts in New York's Garment Center, this paper examines how global processes of economic restructuring are played out at the local level in the production and reproduction of the urban landscape, and how these conflicts are mediated by the local state.

TERRITORIALITY, INCUMBENCY, AND IDEOLOGY IN NATIONAL ELECTIONS by J. Paul Herr, Indiana University at South Bend, South Bend, Indiana 46634

In recent years, two political phenomena have confounded the political pundits who attempt to explain voting behavior in the national elections for the presidency and the congress. First, despite Republican landslides in the presidential elections, the Democrats have held on to their dominance in the congress and, in particular, the house of representatives. Second, there has been an increasing tendency for incumbent house members to be returned to congress with little apparent regard for political ideology. In this paper, I examine these two phenomena in the state of Indiana which usually votes Republican in presidential balloting but has elected a majority of Democrats to the house of representatives for much of the last twenty years. In the 1988 elections, voters in the state also returned all of its incumbents to congress. I present evidence here that these apparent contradictions are explained by an increasing tendency for the congressional elections to be decided by turf-based issues and for the presidential elections to be non-turf-based. While this is not a new phenomenon, the mobility of capital and the resulting competition between locales has served to strengthen this tendency.

KOREAN IMMIGRANT ENTREPRENEURS IN THE LOS ANGELES GARMENT INDUSTRY by Darrel Hess, Department of Geography, University of California, Los Angeles, California 90024.

In the 1970s, Korean immigrants began entering the Los Angeles garment industry in increasing numbers as sewing and cutting contractors. Currently, about 20 percent of all garment contracting shops in Los Angeles are owned by Korean immigrants.

A case study was undertaken to analyze this rapid influx of Korean immigrant entrepreneurs. On-site interviews and a mail survey of Korean contractors were used to gather data on the entrepreneurial background of owners, as well as on their relations with other manufacturers.

It was found that most Korean contractors came to the United States with college or professional training but without any experience in the garment industry or in running their own business. Following the lead of previous Korean immigrants, they entered and succeeded in the garment industry by utilizing a variety of ethnic and class resources, including a highly organized Korean contractors' association which aided member firms in resolving problems that they faced.

It was also found that linkages of trust, developed in part along ethnic lines, facilitated business transactions within this industrial agglomeration.

BUSINESS SERVICES AND ECONOMIC DEVELOPMENT; THE CASE OF BALTIMORE, MARYLAND by Martin Hessels, Urban Geography, Department of Geography, University of Utrecht, P.O. Box 80.115, 3508 TC Utrecht, The Netherlands.

Employment in Baltimore is growing again, after a long period of decline. Revitalization policies were especially succesful in the downtown area. Producer services, in particular business services, experienced strong employment growth in Baltimore after 1980. This raises the issue of the role of business services in economic development.

Analysis of interviews with business services in the Baltimore metropolitan area leads to the conclusion that downtown business services are useful indicators of the economic vitality of the city's downtown, and possibly also other urban centers. The location of downtown business services is rather autonomous. Their presence in the inner city does not reflect the necessity to be in close proximity to commercial and labor markets, but above all an explicit, often slightly intuitive preference to be located in a downtown environment. The autonomous location behaviour of downtown business services could enable them to act as pull factors, thereby initiating economic development. An area that offers abundant high quality business services and other producer serving firms (such as finance, insurance and real estate) could incorporate appealing qualities for other businesses and organizations to locate in.

Baltimore's city government has not explicitely aimed at the acquisition of business services into the downtown area. However, these services could certainly be valuable elements for economic development and deserve a place in revitalization policies.

VALIDITY OF GENERAL CIRCULATION MODEL SIMULATION OF SYNOPTIC SCALE CIRCULATION by B.Hewitson, and R.Crane, Dept. Geography, Penn State University, University Park, PA16802.

In the face of predicted global climate change, General Circulation Model (GCM) ability to simulate basic synoptic scale circulation is evaluated. Principal component analysis is used to extract primary continental scale circulation modes over the United States from both GCM and NMC gridded data. The data are analyzed annually and seasonally, as well as at regional and continental levels. Principal components of each data set are correlated to determine the degree to which present day circulation is modeled by the GCM. A number of high correlations are obtained for seasonal and annual data, containing a significant portion of variance explained. Spatially, the correlations are confined primarily to regions strongly influenced by the circumpolar vortex. The importance of the various physical processes reflected in the GCM are then appraised in relation to climate, and consideration given to those which are poorly modeled.

PLANNING FOR DISEASE EMERGENCIES IN PUBLIC WATER SUPPLIES by N. C. Heywood, University of Wisconsin, Stevens Point, WI 54481, and S. M. Johnson, Planning Department of the Town of Leesburg, Leesburg, VA 22075

Mass media give increasing attention to contaminated community water supplies, but with emphasis on surface- and groundwater pollution by man-made toxic materials; likewise, popular awareness centers on these artificial contaminants. The reported incidence of mass waterborne disease outbreaks in the United States also is increasing, but with less publicity. Outbreak severity differs regionally, and case studies further reveal the varied availability, implementation, and efficacy of municiple water system emergency plans. Such inconsistent preparedness reflects underlying spatial imbalances in disease awareness, risk communication abilities, perception of planning needs, and allocation of planning resources.

SQUAMISH RIVER SEDIMENT: SOURCES, STORAGE, AND TRANSPORT by E.J.Hickin, Department of Geography, Simon Fraser University, Burnaby, B.C., Canada V5A 1S6

The purpose of this paper is to describe the sources, storage sites, and seasonal pattern of transport of suspended sediment carried by Squamish River, a major river draining 3600 km^2 of the Coast Mountains of southwestern British Columbia. Differencing of digitized bathymetric surfaces based on the Canadian Hydrographic Services surveys of 1930, 1973, and 1984, at the head of Howe Sound near the town of Squamish is employed to yield a long-term sediment flux from Squamish River. The flux is thus calculated to be 1.29×10^6 m^3a^{-1} or 1.81×10^9 kga^{-1}, rates which are consistent with loads calculated from flow and sediment concentration regimes measured in the estuary in 1973-1975, and 1987-1988.

The annual regime of water and sediment indicates that the modal discharge-effectiveness class is 600-700 m^3s^{-1}, moving 13 per cent of the annual suspended sediment load. Discharges up to 1400 m^3s^{-1} constitute 99.8 per cent of all flows and are responsible for transporting 81.5 per cent of the annual load. A very significant 18.5 per cent of the load is moved by large magnitude floods (>1400 m^3s^{-1}) which occur less than 0.2 per cent of the time.

Sediment concentration displays a strong seasonal rhythm and shifts in local rating curves indicate that the estuary reach is an important seasonal storage site for sediment. Longer-term storage of suspended sediment occurs in 3m thick horizontally laminated rhythmites of the estuary floodplain. These are not preserved for long, however, since Squamish River delta is prograding downfiord at an average rate of 3.86 ma^{-1} m with local extensions as great as 20m in a given year.

Some of the geomorphic implications of extrapolating these contemporay rates of floodplain extension over the entire Holocene are discussed briefly.

THE SOCIAL GEOGRAPHY OF TORONTO, 1901-1931 by Daniel Hiebert, University of British Columbia, Vancouver, B.C. CANADA V6T 1W5

Recent work in urban history contends that the socio-spatial structure of urban life in North America was profoundly transformed by industrialization during the late 19th and early 20th centuries. The replacement of an artisanal with a wage labour force together with a growing separation between home and work is seen to have led to a weakening of "traditional" bonds, such as ethnicity and religion, while economic affiliations, i.e. class, were strengthened. However, this research draws almost exclusively on United States examples and is predicated on the assumption that social change is immediately, and simply, registered in the residential landscape.

In this paper, Toronto's social geography will be examined during the 1901-1931 period, a time of rapid economic and social change. A sample of households drawn from tax assessment rolls, together with a range of other sources, is used to compile a composite picture of the changing distribution of social groups in the city. This research reveals the remarkable resiliency of religion and ethnicity in defining Toronto's urban landscape, despite the increasing importance of class relations in the society at large. This finding challenges several commonly accepted ideas about the development of North American cities, especially: (i) that ethnic-religious bonds weakened as class relations became more clearly defined, and (ii) that Canadian and U.S. cities evolved in identical ways.

A REVOLUTION IN DEVELOPMENT THEORY: FROM SPACE TO PLACE by Bryan Higgins, Department of Geography, State University of New York, Plattsburgh, NY 12901.

A major change within regional development theory in the 1980's has been the devaluing of its spatial separatist foundation. Marxist and humanist researchers have significantly transformed the intellectual spectrum in both geography and regional science. In addition, revolutionary governments and social movements have also developed radical notions of their place in the global village. This global dialectics between space and place will be the focus of this investigation. In the process of exploring this development it will examine the relation between this shift in geographic thought and social change in the global village. To clarify a radical perspective of place; it will include an analysis of the place of race, class, gender and social movements in territorial development today.

THE GEOGRAPHY OF THE AMERICAN UPPER CLASS by Stephen R. Higley, University of Illinois, Urbana, IL 61801.

As individuals are stratified into social classes, places take on similar characteristics of social class and relative status. The purpose of this presentation is to explore the intersection of class and place at the upper end of the American socioeconomic spectrum. Whereas the United States has never allowed the force of law to formalize class position for individuals, the laissez faire operation of the real estate market, combined with strategic legal constructions such as restrictive land covenants, zoning, and municipal incorporation, has resulted in a place hierarchy with social consequences for all of society.

The 1988 Social Register, the recognized directory of white, Anglo-Saxon, protestant society is geographically analyzed by zipcode. The presentation will summarize the primary and secondary residences of the American upper class at the state, metropolitan and community level. A typology of upper class place is developed from the research and will be photographically explored at the presentation. Come and visit Lake Forest, Sutton Place and the Gold Coast of Long Island with me!

ASSESSING AGRICULTURAL PRODUCTION IN ALBERTA WITH AN INTEGRATED, BIOPHYSICAL LANDSCAPE APPPROACH

J. HILEY	Agriculture Canada.	Edmonton,	Alberta.
W. PETTAPIECE	Agriculture Canada.	Ottawa,	Ontario.
R. WEHRHAHN	Alberta Agriculture.	Edmonton,	Alberta.
K. HEMMERLING	Alberta Agriculture.	Edmonton,	Alberta.

Research into the integration of a number of land-related databases for regional agricultural research has produced two databases which assist in the analyses of provincial production trends. This paper will focus on the methods used to define biophysical landscape units and the procedures required to link external data from Statistics Canada and the Alberta Hail and Crop Insurance Corporation to these Agroecological Resource Areas.

Preliminary results demonstrate that strong associations exist between variation in land use, crop productivity, livestock production, or economic parameters and characteristics of the land resource base. Potential applications of this information to regional and rural planning in an agricultural area will be considered.

TRANSLATING THE DISCIPLINE FOR EDUCATION: A PROGRAM TO DEVELOP PRE-COLLEGIATE INSTRUCTIONAL MATERIALS by A. David Hill and James M. Dunn, Department of Geography, University of Colorado, Boulder, CO 80309.

Since the AAG's High School Geography Project (HSGP) of the 1960s, there has not been a major curriculum development project in the United States to translate geography for precollegiate educational purposes. The recent attention to increasing geography's role in the school curriculum creates a demand for instructional materials. To address this demand, a program of the Center for Geographic Education at the University of Colorado is designed to translate the content of the discipline, create materials capable of enhancing the development of critical thinking, and adapt to the institutional context of America's schools.

The program engages geographers, educators, and classroom teachers as developers of inquiry- and issue-oriented materials designed to build critical thinking skills and address attitudes and values. "Global Geography," the video series produced by AIT, provides a foundation upon which the new materials are built. Development, teaching trials in Colorado classrooms, revision, and national field testing through the network of state geographic alliances leads to preparation of the materials for publication.

OPPORTUNITIES AND CONSTRAINTS TO REDUCE CO_2 EMISSIONS FROM TRANSPORTATION by Edward L. Hillsman and Frank Southworth, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6206.

Transportation vehicle operations in the US contribute 32% of the nation's emissions of carbon dioxide, and 7% of the world's emissions from energy use. Technical options exist to reduce emissions, but the effectiveness of these options depends upon decisionmaking, trends, and incentives in the sector, and on policies that may be adopted to influence them. We reviewed literature that describes decisionmaking in the transportation sector, to identify opportunities and constraints for policies to reduce the sector's emissions of greenhouse gases. Based on this review, such policies must recognize the need to coordinate key decisions for which responsibility now is fragmented among diverse groups of decision makers. For example, policies to increase vehicle fuel efficiency affect decisions by vehicle suppliers, transportation service suppliers, and those who demand transportation services; policies to shift to alternative transportation fuels affect decisions by these decision makers, by fuel suppliers, and possibly by infrastructure developers as well.

Long-term increases projected in the demand for transportation services will offset emission reductions from fuel switching or from improved vehicle fuel economy, unless service can be delivered by modes with lower emissions, or unless growth in demand for transportation can be managed as is now occurring for demand in other sectors of the economy. Additional research is needed to determine the most effective demand management strategies.

THE ROLE OF SWIDDEN-FALLOWS IN THE PROVISION OF GAME: EXAMPLES FROM AMAZONIA by M. Hiraoka, Millersville University, Millersville, PA. 17551.

The study of traditional management systems is gaining popularity in view of the inability of modern agriculture to provide sustainable returns and to protect adequately the environment. Autochthonous systems ranging from native to mestizo ones are currently the focus of attention. Initial findings suggest that local resource use systems offer potentials for attenuating the rate of ecological disruptions, especially the loss of biodiversity, while producing adequate economic returns. This paper focuses attention on the role of traditional swidden fallows in the production of animal proteins. Fallows, characterized by diverse habitats, high biomass productivity, and proximity to swiddens, support a large faunal biomass, especially rodents and avian fauna. The ready accessibility, reliability of harvests, and restricted number of species, among others, are factors that make the fallows important hunting grounds. Data collected in a riverine community of Northeast Peruvian Amazon, and combined with reproduction, growth, and population dynamics information demonstrate the importance of fallows as major sites for sustainable supply of meat. The traditional emphasis on fallows, not only for proteins, but also for food, medicinal plants, and other products,have served to deflect the pressures from large scale opening of climax flora.

GEOGRAPHY AND THE EMERGING GLOBAL HYDROLOGY by Katherine K. Hirschboeck, Louisiana State University, Baton Rouge, LA 70803.

Global-scale hydrology, hydrologic regionalization, and the influence of climatic variability on hydrologic regimes are three topics at the forefront of hydrologic research today that echo some of the classic themes of traditional geographic inquiry. This paper (1) traces the origins of these themes both within and outside of the discipline of geography, (2) reviews examples of ongoing research under each topic, (3) suggests ways in which physical geographers are especially qualified to contribute to these themes, and (4) proposes the development of "global flood hydrology" as an example of a geographic approach in harmony with the global hydrology concept.

The theme of regionalization has been pursued under various guises for some time within both geographical and engineering hydrology. It is only recently, however, that the themes of global-scale processes and climatic change have received widespread attention in the discipline. Geographers -- who have long been engaged in studies of the global water balance, the response of geomorphic and hydrologic processes to climatic and human-induced perturbations, regional and global synoptic climatology, and aspects of time, space, and scale -- are well-qualified to emerge as experts in global hydrology issues. Flood hydrology and flood frequency analysis are areas especially suited to a geographic global-hydrology approach because spatial and temporal patterns of flooding variability involve so many of the facets that are integrated in physical geography: climate, vegetation, geomorphology, soils, and water resources.

URBAN FOREST PATCH CHANGE, 1957-1980, IN ST. PAUL, MINNESOTA by Elizabeth Hobbs, Macalester College, St. Paul, Minnesota 55105.

Processes of urban vegetation change vary spatially, as do the patterns of development and of the vegetation itself. When one part of the city may be experiencing one type of change, another part, in another stage of development or with different initial vegetation, may be undergoing quite different processes.

Urban forest patches were defined as stands of trees of at least one half hectare with at least 50% canopy cover. This were mapped for a 25 square mile portion of St. Paul, Minnesota, from black and white air photos taken in 1957 and 1980. The data were digitized and analyzed using pcARC/Info.

Between the two years, forest patches decreased in both number and total area. However, these changes were not uniform throughout the study area or among all types of forest patches. Most forest patch loss was in older neighborhoods, probably as a result of Dutch elm disease. The areas which were newly developed (or as yet undeveloped) in 1957 were apparently much less affected by that disease and made substantial gains in both the number and area of forest patches by 1980. Thus the asynchronous development of the central city and its periphery resulted in urban forest in different stages of susceptibility to disturbances. This is turn led to shifts in the pattern of forest development over time within the city.

ERROR IN MANUAL DIGITIZING OF CARTOGRAPHIC POINT FEATURES by Michael E. Hodgson, Department of Geography, University of Colorado, Boulder, CO 80309.

Of the three primary methods for recording the spatial location of cartographic point features - keyboard entry, manual digitizing, and scanning - manual digitizing with a puck and tablet is by far the most utilized method today and will likely be so for sometime in the future. While a number of studies have provided some insight into the positional error introduced in the surveying or production of a printed map, little is known about the error introduced in the digital data capture process. When conducting analyses using a geographic information system it is essential that the amount of error be known in each of the processes as well as the final cumulative error. This presentation provides a brief summary of the sources of positional error in a digital cartographic database and presents the results of research on the relative positional error associated with manual digitizing of point features represented by different symbol sizes and types. Cumulative error in manual digitizing of maps is discussed in GIS analyses.

USING "SURFER" GRAPHICS TO STUDY PRECIPITATION NORMALS IN THE SOUTHEAST by Thomas W. Hodler and Philip W. Suckling, Department of Geography, University of Georgia, Athens, Georgia 30602.

The use of SURFER computer graphics software is demonstrated by presentation of a series of maps in a study of precipitation for six southeastern states (TN, NC, SC, GA, AL, MS). SURFER's GRID function (kriging) used annual precipitation totals for 99 weather stations, and TOPO generated isohyetal maps including one for the official 30-year normal period of 1951-80. This period contains the decade of the 1950s, during which several years experienced severe drought across the southeast. Several drought years also occurred in the region during the decade of the 1980s (represented by the 8-year period 1981-88). Maps are presented illustrating that the spatial patterns of precipitation for these two decades (1981-88 versus 1951-60) differed substantially.

In a few years, "new" normals for the period 1961-90 will be published. As a preliminary view, a map of 1961-88 "normal" precipitation for the southeast is presented. Comparison to the "old" normal (by means of a difference map and SURFER's utility functions) reveals that most (67.5%) of the study area has experienced an increase in normal precipitation, despite the well-publicized droughts of the 1980s. Decreases in normal precipitation are confined to western and northern North Carolina through eastern and central Tennessee, with smaller decreases in parts of central and northern South Carolina into northeastern and central Georgia. Given that 1989 has not been a drought year, it is likely that most of the study area will indeed have "wetter" precipitation normals when the new 1961-90 values are published. In other words, the droughts of the 1980s have not been as profound as those of the 1950s.

WATER BALANCE EVALUATION OF THE MISSISSIPPI RIVER FLOW REGIME: 1932-1988, Judy L. Hoff, Louisiana State University, Baton Rouge, LA 70803.

The Mississippi River has a drainage area of approximately 3.2 million square kilometers, which ranks it as the world's third largest river system. After the disastrous floods of 1927, the U.S. Army Corps of Engineers established a massive control system of levees, revetments, diversions, and reservoirs for channel stabilization and river regulation. Also since that time, major landscape changes have occurred within the river's drainage area, including increasing urbanization and economic development. Today, as a result, several questions present themselves: Has the flow regime of the Mississippi River changed significantly in the last half-century? If so, are changes in the river's hydrology the result of altering land uses and channel modifications? Or, are any recent changes in the river's regimen a result of climate variability?

A water balance methodology provides a framework for evaluating variations in river discharge over time by separating the effects of land use changes and river-basin management from variations in climate. In this paper, the Thornthwaite monthly water balance components of surplus and runoff are used as an index to evaluate the Mississippi River system for the water years 1932-1988.

AN EXAMINATION OF THE CARTOGRAPHIC ADEQUACY OF THE FLOOD INSURANCE RATE MAPS FOR TERREBONNE PARISH, LOUISIANA by Michael E. Hoffpauir, Department of Geography, United States Military Academy, West Point, New York 10996

During the summer and fall of 1985 the coastal parishes of southeastern Louisiana experienced the fury of three Atlantic tropical cyclones. Hurricanes Danny, Elena and Juan upset the normal patterns of living and commerce of the people of the area. The factor most responsible for this disruption was the flooding of private homes and businesses caused by storm surge and rainfall. Immediately after the floods, concerned citizens and community officials began to focus their attention on flood-related problems, especially the use of federal Flood Insurance Rate Maps as a tool for hurricane-hazard mitigation. In this paper I present the results of my examination of shortcomings identified by map users and myself for the set of Flood Insurance Rate Maps covering Terrebonne Parish, Louisiana.

To improve the cartographic effectiveness of the mapset, enhance hurricane hazard mitigation efforts, and reduce mapping costs, I propose 1) use of better map symbology, 2) overprinting of flood hazard information on United States Geological Survey 7.5 and 15 minute quadrangles and, 3) development of a parish-wide computer-based cartographic information system.

MEDIA AND THE REDEVELOPING CITY: EQUIVOCAL RELATIONS by Briavel Holcomb, Urban Studies, Rutgers University New Brunswick NJ 08903, and Peter Parisi, Humanities Division, Pennsylvania State University, Middleton PA 17057.

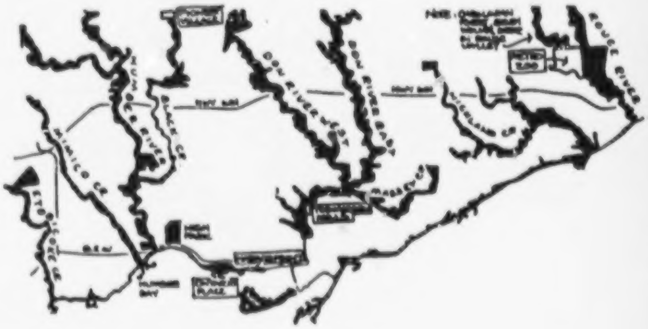
Urban boosterism is not new. For over a century newspapers have been active promoters of community growth. Local newspapers are typically "locally dependent firms" whose prosperity depends on the health and growth of the local economy to provide advertisers and subscribers. However, while the initial growth of a community usually benefits most of its members (though competing communities may suffer), redevelopment typically has costs which are borne disproportionately by particular segments of the community (e.g. renters and small businesses displaced by rising rents or by demolition). The debates and decisions about contemporary urban redevelopment, often through the aegis of a 'public-private partnership', are typically carried on in private and made public through press releases. Opponents to and victims of redevelopment thus become less visible and vocal. This paper uses anecdotal evidence from several cities to illustrate the dilemmas of press coverage of redevelopment. The uses of 'background stories' to give voice to muted critics, of 'creative objectivity' to provide balance, and the conflict between the ethical responsibility of supporting the general public good vs. the interests of subgroups within the community are discussed.

THE MIX OF PUBLIC AND PRIVATE IN CANADA'S URBAN LANDSCAPES, by Deryck W. Holdsworth, Department of Geography, Penn State University, University Park, PA 16802.

Canadian urban landscapes defy easy categorization. Most have distinctive "signatures", their own melange of site attributes and settings, but at the same time there are also many similarities between most Canadian urban places. These unique and generic elements are the products of both the inertia of regional historical development and more recent standardizing forces associated with government and nationally organized enterprises. This paper offers vignettes of recent change in Canadian urban places that illustrate the Canadian mix of public and private initiatives that have made (and persist to remake) distinct yet similar urban landscapes. My goal is to move back and forth between the contemporary and past "sense of place" of particular urban realms, to emphasize elements within the palimpsest of built environments that are imbued with significant social meaning, and then attempt to suggest the more widespread, pan-Canadian incidences of such elements.

URBAN ECONOMIC STRUCTURE AND THE URBAN UNDERCLASS: A POSSIBLE LINK by Steven R. Holloway, Department of Geography, University of Wisconsin, Madison, Wisconsin, 53706.

Social and living conditions of the most socially isolated and disadvantaged residents of American cities have dramatically deteriorated over the last twenty years. One of the most important contemporary investigators of the urban underclass, William Julius Wilson, has recently hypothesized in his book, The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy, that much of the fate of the underclass is connected to the nature of the urban economy. He specifically posits that the connection between urban economic structure and social dislocations characteristic of the urban underclass is black male joblessness, or the shortage of marriageable men. This paper opperationalizes Wilson's ideas in a spatial analysis of the related social dislocations of unwed adolescent childbearing and single parent family structure. Findings indicate that the intensity of the social dislocations exhibit substantial spatial association with selected characteristics of urban economies. Furthermore, Wilson's hypothesized intermediate link of the supply of marriageable men receives support.



SERVICE INDUSTRY DEREGULATION: THE CASE OF COMMERCIAL BANKING IN OHIO by Brian P. Holly and Audrey E. Clarke, Department of Geography, Kent State University, Kent OH 44242-0001.

The deregulation tide of the 1980s has caught up with commercial banking, one of the most highly regulated financial services in the economy. This paper examines the impact of deregulation on the behavior of banks in Ohio. Data from a survey of commercial banks are analyzed with respect to the changes a deregulated environment are engendering on bank structure, services and strategic planning.

Banking organizations appear to bifurcate along a size dimension with larger banks viewing deregulation more positively than smaller banks. The former have more spatially extensive markets, offer more products and services, are more likely to engage in interstate banking, use computer technology more extensively and internalize business services to a greater degree. Smaller banks view deregulation, interstate banking, the emergence of bank holding companies and unregulated financial supermarkets, non-bank banks and foreign banks as destabilizing influences whereas larger banks do not.

Deregulation encourages consolidation through mergers and acquisitions, thus placing smaller banks at a greater risk of absorption into larger banking organizations. Furthermore, smaller banks are at a competitive disadvantage with respect to larger banks operating in the same markets. This helps to explain the different perspectives on deregulation.

ACCESS TO GEOGRAPHIC INFORMATION by Daniel O. Holmes, Department of Geography, University of California, Berkeley, CA 94720.

Vast quantities of geographic information are extant but largely unavailable due to limitations in access technology. Historical methods using place names, geographic codes, and index maps are inadequate. Digital formats and the large volumes of geographically relevant material currently being produced make contemporary information even more obscure to the average researcher than it was in the past. The Research Libraries Group and others have done users' studies to demonstrate the extent of the problem. Potential solutions do exist!

A cooperative effort at the University of California's Berkeley campus has produced a computerized prototype system which utilizes high-resolution color raster and vector displays, a powerful CPU, and relational databases for improving geographic information access. Known as *Imageview*, this project shows that the technology is in place for full development.

As a problem of broad significance and great relevance to geographers, more cooperation is needed to produce a truly working solution to this vexing problem.

THE CONTINENTAL INTEGRATION OF THE NORTH AMERICAN AUTOMOBILE INDUSTRY by John Holmes, Queen's University, Kingston, Ontario, K7L 3N6

The continental integration of the U.S. and Canadian automobile industries quickly followed the negotiation of the Auto Pact in 1965. The experience of the automobile industry over the ensuing two decades frequently was cited in support of arguments on both sides of the recent debate over the Canada - U.S. Free Trade Agreement (FTA). This paper critically examines the post-Auto Pact development of the auto industry in North America with particular emphasis on the restructuring that has occurred in the last decade in response to the globalization of production, dramatic changes in competitive conditions, and widespread technological change. Within this broader context of international restructuring, the paper seeks to explain the strong resurgence of the auto industry in Canada during the 1980s. It also assesses the future prospects of the industry by examining the likely impact of both the implementation of the automotive industry provisions of the FTA and the establishment of a significant auto manufacturing presence in North America by Japanese auto-makers.

THE CAPITOL SYNDICATE AND BRITISH AGRICULTURAL EXPERIMENT STATIONS IN THE SOUTHERN GREAT PLAINS by William M. Holmes, University of North Texas, Denton, Texas 76201.

The Texas Constitution of 1876 provided for the eventual extraction and surveying of 3,000,000 acres of northwest Texas to be set aside as the medium of exchange to pay for the construction of a new state capitol building.

The old capitol building burned in 1881; bids were let and ground was broken for the new building in 1882. With the completion of the new building land was titled and controlling interest was purchased by British investors who set about to develop a full fledged ranching operation until such time it became economically feasible to sell land in smaller plots to farmers and stockmen.

In 1884, it was suggested that the division foremen of the ranch assume responsibility for analyzing soils and planting crops. In 1885 the first crops were planted and for the next twenty years, the Capitol Syndicate kept strict records pertaining to crops planted, weather phenomena, crop successes, farming techniques employed and types of implements utilized. Results of these experiments were made available to farmers and prospective land buyers. By 1910, most of the XIT Ranch had been sold and the work of the first dry-land experiment station on the southern Great Plains had for the most part been discontinued.

Virtually all of the research for this paper was done in the archives of the Panhandle Plains Historical Museum in Canyon, Texas where the XIT papers are housed.

THE EFFECTS OF INDUSTRIALIZATION ON THE SOCIAL ENVIRONMENT OF SMALL TOWNS by Catherine Hopey, University of Western Ontario, London, Ontario, N6A 5C2.

The introduction of industry into small communities is occurring with greater frequency. Physical impact studies have been conducted to monitor physical environmental impacts, yet little has been done to monitor the effects on the life and social environment of the community itself. As small-town Canada becomes increasingly industrialized, the need to understand how people perceive the effect industrialization has on the nature and quality of life in their own town increases.

Both the social and the spatial aspects of the perception of change in the social environment need to be investigated. Change in the built environment over time and space can be monitored. Questionnaires and interviews can record the social characteristics of individual members of the community and their individual perceptions. They can also provide insight into the nature of social networks and their effects on perception. Based on this information, the nature and process of perception and change in the social environment may be better understood.

THE SHIFTING POSITIONS OF NEIGHBOURHOODS IN DUTCH CITIES by Adriaan Hoogvliet, Department of Geography, State University of Utrecht, P.O. Box 80115, 3508 TC Utrecht, The Netherlands.

A neighbourhood's position and function are continuously changing. Not only physical and social characteristics of a neighbourhood do change over time, also external factors like changing housing market conditions, the emergence of new residential areas and shifting housing needs affect the relative position of a single neighbourhood.

Several reasons can be given why the early-20th-century neighbourhoods in the three large cities in the Netherlands (i.e. Amsterdam, Rotterdam and The Hague) are experiencing important changes in population composition and housing characteristics.

To investigate the shifting position and function of these neighbourhoods, a survey has been held among the inhabitants. Some of these neighbourhoods appear to get more and more a housing function for young-singles and couples without children and for ethnic minority groups. Others seem to maintain more or less their original function for (family) households with a relatively long residence perspective. In the paper we will try to explain these differences by referring to the variation in dwelling characteristics and by examening the changing housing needs and the shifting relative positions of these neighbourhoods within the larger urban context.

ESTIMATING BIOPHYSICAL QUANTITIES USING REMOTELY SENSED SPECTRAL VEGETATION INDICES: SELECTED CASE STUDIES by A.S. Hope, Department of Geography, San Diego State University, San Diego, California 92182.

Remotely sensed spectral vegetation indices are being used in a number of research projects to estimate biophysical quantities for a diverse range of ecosystems. These biophysical quantities are required for spatial models of ecosytem processes, including the surface energy balance. Each of these projects involves multilevel remote sensing and the acquisition of ground reference data that can be related to the spectral vegetation indices.

Four case studies are presented and an assessment is made of the utility of the spectral vegetation indices for estimating the required biophysical quantities. The case studies cover investigations being conducted in the Arctic, the Konza prairie of Kansas, the Jornada desert of New Mexico and in chaparral areas of southern California.

Results from these studies help allude to the difficuilties associated with remote sensing and the use of spectral vegetation indices in these environments. The use of multilevel remote sensing is shown to be beneficial for studies where physical processes operate at different spatial scales.

INCOMPATIBILITY OF PRESCRIPTIVE RIGHTS AND AN EARLY GRID SURVEY SYSTEM by Daniel Hopkins, University of Missouri-Kansas City, Kansas City, Missouri 64110

In 1804, judgment was rendered in a vexing boundary dispute on the island of St. Croix in the Danish West Indies, now the United States Virgin Islands. Seventy years after a tolerably regular rectangular survey system had divided the island into plantation lots of uniform dimensions, a planter was charged by his neighbors with illegally occupying a long strip of sugarcane land on the wrong side of the surveyed property line. He countered that he had had the land in possession for so long that the original line was no longer material. The court was confronted by the contradiction between traditional legal attitudes toward land demarcation and tenure, which give great weight to existing marks on the ground, local understanding, and rights acquired through long occupation and a preconceived scheme of allocation that attempted to impose, more or less at a stroke, a simple and easily verifiable order upon land-ownership--a designed and codified order rather than an accreted, historically derived order. The official surveyor argued in his testimony that the survey system, which was intended to prevent such suits, was constitutionally embedded in the law of the colony, but the judge ruled without reservation that prescriptive rights to the land in question had been obtained through twenty years' unchallenged adverse possession. The implication is that, although the designers of such systems did not so intend, the lines laid down by formal surveys prior to conveyance, such as the American survey of the public lands, became moot within a generation, if not immediately.

THE USE OF Q20/Q80 FLOW-DURATION CURVE RATIOS IN GROUND-WATER STUDIES by R. Hordon, Geography Department, New Brunswick, NJ 08903

Q20/Q80 flow-duration curve ratios, i.e., the discharge equalled or exceeded 20% of the time divided by the discharge equalled or exceeded 80% of the time, provide quickly determined measures of streamflow variability and potential ground-water availability. The higher the Q20/Q80 ratio, the greater the variability and the more limited the opportunity for ground water storage and yield. Since the ratios are dimensionless, they can be used on watersheds of varying size.

The calculation of Q20/Q80 ratios in New Jersey indicates an enormous range in value, highlighting the fact that certain geologic formations have very large differences in ground-water availability. In particular, streams draining watersheds underlain primarily by argillite and diabase have high ratios as compared to watersheds underlain by shale and sandstone. This difference is substantiated by comparing well characteristics from the different formations and is explained by the great difference in the degree of fracturing. The yields and specific capacities of wells drilled in the argillite and diabase are generally the worst in the entire state.

Many communities in New Jersey rely on local sources of ground water and are therefore desirous of initial estimates of yield. Analysis of flow-duration curves can assist these communities in estimating the magnitude of local supplies of ground water which can then be incorporated in the zoning and planning process.

SYMBOLS IN A CHANGING LANDSCAPE: MEANING IN A PORTRAYED BARBADIAN VILLAGE by Randi Horner, Department of Geography and Planning, East Carolina University, Greenville, North Carolina 27858-4353.

This paper is concerned with the meaning of landscape symbols. Specifically, the landscapes of a Barbadian village portrayed in George Lamming's novel, In the Castle of My Skin, are used in a discussion of the evolution of symbolic meaning vis-a-vis the village's inhabitants. The framework of study is guided by transactional analysis, which states that a symbiosis exists between elements of a landscape and the people who perceive it. It is contended that the dynamism of contextual aspects of the landscap provides unique messages for the villagers, who are its existential insiders.

The context of the landscapes of Creighton's Village is strongly influenced by the daily activities of the villagers and by social and political settings that exist beyond its realm. Dramatic changes in these settings result in changes in the physical form of the village and in the daily activities of the villagers, and thus ultimately in the symbolic meanings of the landscape to its insiders

THE DIFFUSION OF THE CULT OF THE GUATEMALAN BLACK CHRIST OF ESQUIPULAS by O. H. Horst, Department of Geography, Western Michigan University, Kalamazoo, Michigan 49008.

In 1595 the image of a Black Christ, mounted on a cross, was placed in a small chapel in the town of Esquipulas which is located in eastern Guatemala, near its junction with the borders of Honduras and El Salvador. A succession of events, primarily related to a miraculous cure in the mid 18th century, led to the erection of an imposing basilica to which the Black Christ was transferred. The growing fame of the shrine led to an ever expanding network of pilgrimages to Esquipulas and the erection of numerous namesake shrines at distant sites. Esquipulas is now regarded to be the spiritual heart of Central America. Shrines of the cult may be found throughout mainland Middle America and one is known to exist in southwestern United States. Pilgrims to the shrine of Esquipulas are drawn from much of this area.

Records indicate that an ever increasing number of pilgrims is being attracted to Esquipulas. However, field surveys in New Mexico and throughout Mexico and Central America indicate that this increase may be more appropriately attributed to the growth of population within the core area than it is to an expansion of territory from which pilgrims are drawn. Economic and political factors as well as the actions of local clergy have tended to produce an environment which is less conducive to the flow of pilgrims to Esquipulas from more distant regions.

ECONOMIC GROWTH, REGIONAL COOPERATION, AND CO_2 EMISSIONS IN CENTRAL AMERICA by Richard H. Hosier and Mark A. Bernstein, Energy Management and Policy, University of Pennsylvania, Philadelphia, Pennsylvania 19104.

Although they are not currently major contributors to global warming, the five nations of Central America will become a focal point in planning for a reduction in global warming. Growth in the consumption of fossil fuels, the burning of woodfuel, and the destruction of forests for agricultural land contribute not only to economic growth in Central America, but also to the global carbon dioxide problem.

However, problems of global warming are not the primary concerns of the region's policy makers. Foremost in their minds is the need for economic growth, which is heavily compounded by the debt crisis. Also of concern is the need to preserve tropical forests. Energy conservation, insofar as it is economically beneficial and saves foreign exchange, is also of importance. Finally, regional cooperation for economic growth is an important consideration.

This paper will present the results of research which places the national energy balance of the five Central American countries into a multiobjective goal programming framework. The goals to be assessed are increased economic growth, reduction of imports, energy conservation, reduction of forest depletion, and reduced CO_2 emissions. The paper discusses the conclusions in the context of debt-for-nature swaps, carbon emissions fees, and the importance of global warming to developing countries.

RURAL-URBAN DUALISM AMONG URBAN SQUATTERS: A CASE OF SERAJGANJ TOWN IN BANGLADESH by Md. Ziarat Hossain Dept. of CFCS, 201 Slocum Hall, Syracuse University, Syracuse, New York, U.S.A.

Many riverbank erosion affected displacees have taken shelter in Serajganj town. Due to lack of resources, almost all of them become slum dwellers and squatters who are identified as a problem population. This study examines the nature of their social assimilation into the urban society.

A field survey was administered in 1985 to collect the data for this study. Using a probability proportional to size (PPS) approach 207 sample households were drawn from three major squatter concentrations in the town.

The findings suggest that the urban environment cannot encourage in-migrants' smooth assimilation; and they are naturally torn between two cultural worlds of rural and urban. This is due to their limited access to urban facilities, and their induced and artificial isolation from the mainstream of urban life. Therefore, squatters fail to possess either a full urban or a full rural identity. Some administrative and social measures seem to be useful in reducing such a rural-urban duality among squatters.

NEW TOWN PLANNING IN GREATER SEOUL AND TAIPEI: A COMPARATIVE ASSESSMENT by Gary R. Hovinen, Millersville University of Pennsylvania, Department of Geography, Millersville, PA 17551.

A number of Asian countries in recent decades have attempted new town planning approaches in response to the challenge of rapid growth of large urban areas and to the problems of housing and environmental deficiencies in existing developed areas.

This paper investigates similarities in new town planning goals for the capital cities of two newly industrializing Asian countries, Taiwan and South Korea. It also compares two large-scale planned communities in the Taipei and Seoul metropolitan areas and evaluates the degree to which plans have been achieved thus far and why. Interviews with planners, a study of published and unpublished planning materials, and site visits to the two new towns provide necessary data and other information for the evaluation. This investigation concludes that a number of similar goals exist, but the success in implementing plans so far has differed. Both Linkou (Taipei) and Banweol (Seoul) New Towns have faced serious challenges to success, but the South Korean project has been more successful in overcoming obstacles and achieving a momentum of development. Both cases reveal the pitfalls of undertaking large-scale urban development projects and the limitations of government power.

THE LATENT IMAGE OF ART IN GEOGRAPHY by Lance Howard, University of California at Los Angeles, Los Angeles, CA 90024

The dual claim of being an art and a science has been made for both geography and photography. In the latter case an either-or division has separated the practice, but the attempts to professionalize geography as a scientific discipline have suppressed its artistic aspects. Consequently, photographic imagery has been used by geographers primarily for scientific purposes. I will argue that the art/science duality in these practices (and in any other that ends in -graphy) is fundamental and cannot be divided or suppressed. I will situate my discussion in the historical context of the secession of William Morris Davis and others from the National Geographic Society and their subsequent establishment of the Association of American Geographers, the former to pursue the popularization of geography, achieved largely through the use of photography, and the latter to pursue professionalization of geography, with relatively little use of photography.

* * *

ENSO-RELATED VARIATIONS IN ATMOSPHERIC MOISTURE OVER THE SOUTHERN HEMISPHERE by David A. Howarth, Department of Geography, University of Louisville, Louisville, KY 40292 and John N. Rayner, Department of Geography, Ohio State University, Columbus, OH 43210.

Results of analyses of the variations in the distribution and movement of water vapor over the hemisphere for the period June 1980 through May 1984 are presented. Emphasis is placed on examination of the variations evident during the major 1982-83 El Niño/Southern Oscillation event in the tropical southern hemisphere. Data for this work are extracted from the gridded data set compiled by the Australian Numerical Meteorological Research Centre.

Composites of El Niño/non-El Niño seasons indicate differences in the fields of the 850 mb mixing ratio, the zonal and meridional component of the moisture flux, and the water vapor flux divergence. Examination of these quantities in the time domain also indicates a correspondence with the El Niño phenomenon.

Studies such as that presented here illustrate both our lack of knowledge concerning large-scale water budgets and the role that geographers can play in emerging issues of global hydrology.

MONITORING LAND USE AT THE RURAL-URBAN FRINGE OF METROPOLITAN TORONTO USING SPOT SATELLITE IMAGERY by P.J. Howarth, L.R.G. Martin, P. Gong and G.H. Holder, Faculty of Environmental Studies, University of Waterloo, Waterloo, Ontario N2L 3G1.

At the rural-urban fringe of many cities in North America, land is being rapidly converted from rural to urban uses. A major problem is to monitor these changes so that planning decisions can be based on up-to-date information. With the availability of multispectral and panchromatic data from the SPOT satellite at spatial resolutions of 20 m x 20 m and 10 m x 10 m, respectively, remote sensing specialists can observe much more detail than was previously possible with the Landsat MSS system at 60 m x 80 m spatial resolution.

During the past three years, studies have been undertaken using data from the Metropolitan Toronto region to develop methods for detecting, classifying and quantifying urban expansion at the edge of the built city. The studies have involved both enhancement and classification of digital data. Experiments including the use of edge enhancement to improve visual identification, the use of structural measures in image classification and detailed accuracy assessments have been undertaken. In this paper an overview of the studies is presented and an assessment is provided of several different strategies for improving land classification results.

THE CASE FOR MICRO-SYSTEMS ANALYSIS IN RURAL REGIONAL PLANNING by Ben Howatt, University of Maine at Augusta, Augusta, Maine 04330.

This paper sets forth a framework and methodology through which spatial characteristics of Third World agricultural produce marketing can be described without being forced into a spatial structure associated with the settlement system. It presents a conceptualization of a region in which the behaviors of participants involved in commodity-specific, produce marketing "micro-systems" define spatial structure. Using key informants and interviews with participants, the framework was operationalized to describe the potato marketing micro-system in the Ambato Region of Ecuador.

In the Ambato Region, findings reveal that small producers tend to be locked into a "proximity pattern", selling produce at the closest wholesale collection market for potatoes. Large producers, on the other hand, sell in truckloads, often by prior arrangement, to the largest traders operating out of Plaza Urbina in Ambato. Whenever possible, traders at all collection locations ship produce directly from these purchase sites to wholesale distributors located outside the region. Furthermore, traders are seen as operating from those collection markets where, because of established trading relationships, they are assured of both supply and profit. Spatial patterns associated with traders, therefore, are ideosyncratic. In addition, findings reveal that the four specialized potato marketing "ferias" in the Ambato Region are perceived to have greater significance with reference to nearby production zones than with the settlements in which they are located.

The framework provides regional planners in developing nations with a means for assessing the spatial dimensions of marketing systems through which most rural incomes are generated.

PHARMACEUTICALS AND EUROPE 1992 : THE DYNAMICS OF INDUSTRIAL CHANGE by Jeremy Howells, University of Newcastle upon Tyne, Newcastle upon Tyne, NE1 7RU, UK.

The pharmaceutical and chemical industries in Europe are undergoing major changes in the run up to the Completion of the Internal Market in the European Community. These changes in the pharmaceutical industry are being reflected in the growth of integrated research and production systems by major drug companies operating in Europe. Smaller indigenous firms are increasingly being squeezed out or acquired by these major companies in their development of pan-European operational bases. Such trends are, however, within a wider international context as multinational drug companies are seeking to develop global industrial networks. The restructuring of the pharmaceutical industry is also having repercussions on a regional level within Europe and is reshaping the locational and organisational structure of the industry.

THE AGING AND TRANSFORMATION OF MULTI-FAMILY HOUSING IN TORONTO,

by R. J. Hramiak, University of Western Ontario, London, Ontario N6A 5C2.

This paper examines the changing characteristics of this form of housing and its occupants from the mid 1960s-80s. Sales data will be presented which indicate the downward repositioning of values for these structures relative to other forms of housing. This downward valuation will be considered in the context of changes in the supply and demand for this housing, the emergence of condominiums, the nature of its residents, and the operating practices of owners and landlords.

Consideration will be given to the changes among residents as contributing to the trend in valuation of multi-family structures. Census data suggests that increasingly, rental housing in Toronto caters to the younger, less affluent and smaller households with limited disposable income. The growing numbers of elderly households in Toronto are not in the rental market. National and local studies have suggested that condominiums present a lower cost home ownership option which appeals to the price and space requirements of this group.

Another element in the valuation of multi-family housing involves the operational practices of owners and landlords. Economic studies have suggested that premature deterioration of this housing, and ultimately its downward valuation, are the result of inadequate maintenance funding. Empirical data on the pattern of change in maintenance spending is compared with the maintenance levels established in financial feasibility and depreciation models. These models employ a revenue justified approach and ascribe a profit maximizing motive to landlords. The shortcoming of empirical maintenance spending in relation to the models suggests premature deterioration of this housing and puts the downward movement in its relative valuation into context.

THE CHARACTER AND NATURE OF EDUCATIONAL WEEK TRAVEL AND ITS IMPACT UPON THE LOCAL COMMUNITY; A CASE STUDY

by Lloyd E. Hudman, Department of Geography, Brigham Young University, Provo, Utah 84602.

Travel to participate in educational experiences has a long history. Today in the United States this type of travel is becoming more important and demand is increasing. In the United States an early form of educational travel was the Chautauqua movement. The purpose and development of Chautauqua was to combine the study of intellectual subjects with religious pedagogy. Further development of educational travel is expressed in the Elderhostel program in which colleges and universities provide educational experiences for those over 55 during slack periods.

Educational week at Brigham Young University attracts over 20,000 participants from 46 states and several foreign countries for a week-long period of religious and academic classes. Many participants use this week wholly or as a part of their vacation. These 20,000 plus participants have significant impact upon the local community. The purpose of this paper is to report the findings of a study in which the participants of education week, 1987 were sampled to determine the character and relationship of this travel as a tourism phenomena to the impact it has on the local area.

CHANGING PATTERNS IN THE NORTH AMERICAN GRAIN TRADE

by John C. Hudson, Program in Geography, 1810 Hinman Ave., Northwestern University, Evanston, Illinois 60201.

New patterns have emerged in the U.S. and Canadian grain trade during recent decades as a result of an increased emphasis on exports, new sources of demand, and deregulation of some aspects of transportation. The pull of Pacific Rim markets has drawn the Corn Belt west; irrigation and unit-train transport rates have assisted this move. Prince Rupert and the Port of Kalama are, respectively, the Canadian and U.S. windows on this trade. Grain moving from Great Lakes ports and from Churchill has declined in relative importance. Cash grain production has intensified in the Mississippi valley and New Orleans is now the largest U.S. grain port. Waterways developments (Columbia-Snake, Arkansas, Tennessee) have increased internal access and stimulated interregional trade in feed grains; lower rail rates are challenging water transportation in some of these markets. Fewer changes have taken place in the winter and spring wheat regions of the U.S. Great Plains where transportation alternatives are lacking and/or crop production alternatives are limited. Many small, country elevator towns have been negatively affected by these changes and this has further reduced their status as central places.

GEOGRAPHIC SCOPE AS A KEY DIMENSION OF FIRM STRATEGY

by James O. Huff, Department of Geography, University of Illinois, Urbana, Illinois, 61801, and Anne S. Huff, Department of Business Administration, University of Illinois, Champaign, Illinois, 61801.

The geographic scope of an organization is an important construct in economic geography and in the management literature. With the dismantling of many trade barriers between nations, and with increasing globalization of many industries, geographic scope, as a key dimension of business strategy, has increased in importance but also in complication. In our view the two academic fields which might offer additional insight into questions of geographic scope are somewhat biased in theoretical work done to date. Geographers tend to make the location decision unduly pivotal; too little attention is given to the many other strategic decisions which condition location decisions. On the other hand, theorists in strategic management, who have considered scope in a broader context, have at the same time overly simplified the conceptualization and measurement of geographic scope. In those instances where locational strategies are discussed, the most typical treatment is to distinguish firms on a three or four point scale from local to global operation.

Data from the insurance industry show a complex pattern of location decisions, strongly influenced by variance in state regulation, but also by diversity in the firm's portfolio of insurance offerings. Geographic scope emerges as one of a small number of key dimensions defining the domain of strategic change within the industry.

UTILITY OF SNOW COVER DATA IN IDENTIFYING CLIMATE CHANGE

by David A. Robinson and Marilyn G. Hughes, Department of Geography, Rutgers University, New Brunswick, NJ 08903.

Increases in winter snow cover in the Central United States in recent decades (cf. Robinson, 1990: this conference) have been accompanied by colder temperatures and decreased precipitation. As snow cover is one of the most accurately satellite-monitored variables, this suggests that despite large interannual variations, overall trends in snow cover may play a critical role in identifying future regional and global climate change.

Data employed in the analysis include snow, precipitation and temperature reports from over 300 stations, approximately half with records back to the turn of the century, satellite-derived snow observations for the past two decades and results from studies of others. Observations from the Fall and Spring as well as for other variables (eg. cloudiness) are also being examined.

Additional studies in regions with sufficient long-term (>50 years) daily station data are needed to solidify the results presented here. Only then will it be appropriate to consider utilizing satellite-derived snow data in these areas and in regions without available station data in assessments of climate change.

DYSTOPIAN VIEWS OF THE FUTURE IN SCIENCE FICTION FILMS

by Peter J. Hugill, Texas A&M University, College Station, Texas 77843.

Visions of disaster have long haunted writers of science fiction and dystpopias have been as common in the genre as their opposite, utopias. Like utopias, dystopias are fully conceived societies organized around some overarching principle or set of principles. Many dystopian visions correlate well with fears expresed by geographers: overpopulation, climatic change, sea level rise, resource depletion. Others postulate changes following catastrophic wars or extrapolate sets of social trends as rising levels of violence.

This paper and video examines the development of dystopian and utopian visions as expressed in science fiction films from Well's Shape of Things to Come through Fritz Lang's Metropolis to Ridley Scott's Blade Runner. Science fiction films are shown to be serious in their attempts to extropolate present trends into the future and therefore give us a useful insight into beliefs of the popular culture. Early this century the fear most expressed was of catastrophic war: H.G. Well's work is a good summary of this. The depersonalizing trend of industrial society is treated brilliantly in Lang's Metropolis. Two recent films, Blade Runner and Road Warrior, integrate these early themes with more recent themes of overpopulation, ecological collapse, and resource depletion.

THE SYNGENETIC COASTAL KARST AT POINT PERON, WESTERN AUSTRALIA by G. Huppert, Department of Geography and Earth Science, University of Wisconsin, La Crosse, Wisconsin 54601.

Coastal karsts are among the least studied subgroups within the little considered field of karst geomorphology. The Australian coasts exhibit some of the best developed and extensive coastal karsts in the world. The Point Peron karst, located some twenty miles southwest of Fremantle, is one of the more noted examples.

This karst is formed in a late Pleistocene aeolian calcarenite composed of shell fragments and quartz grains cemented with calcite. The formation is known as the Coastal Limestone. Past studies have shown that the karst is largely syngenetic with the lithification of the sediment.

The abundance of small karstforms (solution pipes, rhizomorphs, and some rillenkarren), evidence of changing sea levels (terraces, and wave cut notches), and the syngenetic nature of the karst has resulted in a wide variety of interpretations. These karstforms are compared with similar features found along the coast of San Salvador Island, Bahamas.

COMMUTING PATTERNS OF RURAL AND URBAN-FRINGE COMMUNITIES IN INDIANA: 1984-87, by C. Hurst, State of Indiana, Office of Intermodal Transportation and Planning, 143 W. Market Street, Indianapolis, Indiana 46204 and Department of Geography, Indiana University, Bloomington, Indiana.

Most of the research on commuting patterns assumes either a predetermined workplace location or a predetermined residential location. Although some studies have attempted to model commuting in terms of the interdependencies between housing and labor markets, previous investigations have focused exclusively on urban areas.

This research utilizes data from the Indiana personal income returns from 1984-87 to examine the commuting patterns of the State's rural and urban-fringe communities. Specifically, two questions are addressed: How do changes in these patterns vary across different communities? To what extent are these changes influenced by residential migration vs the spatial redistribution of employment opportunities?

Three types of communities are identified on the basis of changes in their patterns of commuting flows: Stable or lagging communities experiencing increased outmigration, outcommuting, and local employment loss. Growing, export-based communities showing both increased inmigration, incommuting, and local employment growth. Suburbanizing communities experiencing increased inmigration, increased outcommuting, and little local employment change.

AMERICAN SOCIAL CONSCIENCE AND OUTMIGRATION FROM NEW ENGLAND BEFORE THE CIVIL WAR, by Eliza Husband, Department of Urban and Regional Planning, University of Illinois at Urbana-Champaign, Urbana, Illinois, 61801.

"Social conscience," or participation in public issues based on an ideal of human conduct, can have effects that are slight or considerable, lasting or brief. For instance, the movement to abolish capital punishment in the United States went through two historical phases whose long-term effects were markedly unequal. Pre-Civil-War legislation to abolish capital punishment was more lastingly successful than legislation originating in the Progressive Era 1895-1914. It is hypothesized that "social conscience" based on a specifically New England liberal intellectual and political tradition, lasting until at least the 1850s, was the basis of the more enduring anti-death-penalty laws. New Englanders emigrated widely to the northern states during the first half of the nineteenth century, and were soon joined by Scandinavians of similar political ideology.

A poster exhibit includes maps, graphs, tables, and contextual materials to present the comparison of states where legislation resulted from the earlier and later anti-death-penalty campaigns. The states are examined at the time of legislation for per centage of their population as a whole, and per centage of legislators and executive officials, born in the New England states or descended from Scandinavians. The results of non-parametric statistical tests suggest that New-England-settled states for the earlier legislation period, and Scandinavian-settled states for the later legislation period, retained their anti-death-penalty stance for a significantly longer time than did those states whose opposition was based on a contemporaneous national popular movement rather than a regional intellectual and political tradition.

A COUNTRY WITHOUT PEOPLE: VISITORS' EXPECTATIONS OF ZAMBIA by Winston Husbands, Ryerson Polytechnical Institute, Toronto, Ontario M5B 2K3.

The fauna and flora of Zambia's national parks, together with aspects of aboriginal culture, form the major tourism attraction of Zambia. However, a viable tourism industry usually requires a wide range of worthwhile benefits. Moreover, problems of poaching and inadequate financing threaten the long-term viability of national parks throughout Africa. In 1987, foreign visitors in South Luangwa National Park, Zambia, participated in a survey aimed at examining the role of various benefits in visitors' expectations of a rewarding visit to Zambia, and assessing visitor satisfaction with the relevant tourism benefits. Visitors were almost unanimous in seeking wildlife, scenery and opportunities for experiencing local culture, and defined their expectations and experience of the Zambian tourism product almost exclusively in terms of wildlife and scenery. The Zambian tourism product is therefore highly undiversified, and attracts an especially stylised clientele. This situation may be beneficial for species conservation in the national parks, but it cannot contribute significantly to the parks' financial security.

AN ASSESSMENT OF ASEAN by Antonia Hussey, Department of Geography, California State University, Northridge, Northridge, California 91330.

The Association of Southeast Asia Nations (ASEAN) is composed of Thailand, Malaysia, Singapore, Indonesia, the Philippines, and Brunai. It was founded in 1967 to promote intra-regional trade, to facilitate economic cooperation and to stimulate economic growth. The organization became effective after a summit meeting of the national leaders in 1976. Since then, the trading among ASEAN nations has increased significantly in terms of US Dollars, especially when compared to figures for intra-regional trade among other Third World organizations. However, ASEAN statistics are somewhat skewed as petroleum accounts for a majority of the dollar figures. Economic cooperation among ASEAN nations thus far is still rather limited particularly as defined by the goals of the organization. For example, ASEAN nations still retain high tariff barriers, compete with similar products in export markets, and are still unable to agree on joint venture development projects. In spite of the limited achievement in economic performance, ASEAN has emerged as a strong political force in Southeast Asia as exemplified by the ASEAN initiated first round of talks between Viet Nam and Cambodia. In addition, through the creation ASEAN, a regional identity has emerged and has been recognized by the leaders of the ASEAN nations. Southeast Asia is now identified externally by the U.S. Government, and the world development agencies by the acronym ASEAN.

THE CULTURAL LANDSCAPE OF THE CHEROKEE NATION IN OKLAHOMA by Janice H. Hutchings, Indiana University-Indianapolis, Indianapolis, Indiana 46202.

The cultural landscape of the Oklahoma Cherokee is examined. Oklahoma, originally "Indian Territory," contains more native American tribes and the highest concentration of Cherokees than any other state. This profile provides the backdrop for investigation of this viable community in the twentieth century.

Often there is a direct relationship between culture and physical geography. Many native American tribes manifest this through attitudes toward land use and their surrounding environment. Cherokee emigrants, forced to move in the "Trail of Tears," settled in the uplands of the Ozark Plateau in an environment similar to their original Appalachian homeland.

Data were collected by field survey of northeastern Oklahoma, interviews with tribal leaders, and a collection of oral histories. Using the Meinig model of core, domain, and sphere, the geographical concentration of the Cherokee Nation can be illustrated.

MEGAEARTHQUAKES, TECTONIC DEFORMATION, AND LATE HOLOCENE SEA LEVEL CHANGE IN CASCADIA by I. Hutchinson,

Geography Department, Simon Fraser University, Burnaby, British Columbia V5A 1S6

In areas around the Pacific Rim where young crustal plate material is being subducted, the characteristic earthquake pattern is one of infrequent but very intense (Mw >8) earthquakes. A major debate has developed over the last few years as to whether the crustal plates lying offshore of southwestern B.C., Washington and Oregon possess these same characteristics. The most compelling evidence of repeated megaearthquakes along the Cascadia subduction zone in the recent past consists of deposits of intercalated peats and sandy muds in the estuaries of southwestern Washington and north-central Oregon. These are interpreted as resulting from jerky coseismic subsidence. The alternative explanation, that these cyclothems represent a stratigraphic response to episodic sea-level rise, is difficult to test because of the problems of determining a relative sea-level curve free from tectonic influence along this coastline. In this paper I present results derived from a comparison of patterns of late Holocene sea-level change in Cascadia with tectonically-stable and actively-subducting coastal areas elsewhere in the world in an attempt to constrain the magnitude of tectonic deformation in Cascadia. The results indicate that coseismic deformation along this subduction zone during the late Holocene has been very small, and call into question the validity of the megaearthquake scenario.

COMPETITIVE ADVANTAGE AND NATIONAL ECONOMIC PERFORMANCE by

M. Hynes, The Ohio State University, 103 Bricker Hall, 190 North Oval Mall, Columbus Ohio 43210.

This paper explains the competitive disadvantage of U.S firms in the global economy in terms of problems of industrial organisation. Comparative advantage, as it is typically discussed in neoclassical accounts of productivity, cannot capture the complexity of the types of advantages that firms, industries, and a nation can build. This paper suggests that it is necessary to enact change at three levels of analysis to facilitate the U.S. economy regaining a competitive position in numerous industries. The three levels of analysis are at the firm, at the inter-firm, and national sector levels. At all three levels, the importance of technological and organisational differentiation, as well as government policy are critical to understanding the outcome of international trade, and the creation of competitive advantage.

LAND RECLAMATION AND THE PAST IN SOUTHERN ITALY by J.L.C. Ibanez.

Department of Geography, The University of Texas at Austin, Austin, Texas 78712-1098.

This paper will review land reclamation along the coast of Metaponto and Crotone in Southern Italy. Since World War II, lands which were previously uncultivated have been drained or irrigated. Moreover, the adoption of new technologies such as the deep plow has precipitated the destruction of many archaeological sites. This report is based on field observations sponsored by The Institute of Classical Archaeology at The University of Texas at Austin.

The continued development of Southern Italy is being promoted by European farm policies. Due to EEC subsidies: 1)traditional patterns of crop growth are being abandoned in favor of cash crops; 2) direct grants and subsidies from Brussels are being used tc develop the infrastructure, industry and technology of previously neglected or depressed areas, such as Italy's mezzogiorno. Furthermore, the unified market projected for 1992 will create a free exchange of labor, capital and technology, which may also accelerate development at the expense of the as yet unrecorded environmental and cultural evidence of the past.

SUPPLY CONTROL MEASURES AND FARM DIVERSIFICATION IN BRITAIN

by B. Ilbery, Department of Geography, Coventry Polytechnic, Priory Street, Coventry, CV1 5FB

Agriculture in Britain has undergone considerable change since the mid-1980's as attempts are made to overcome the twin problems of agricultural overproduction and declining farm incomes and to tackle the environmental problems created by a more modernised and industrialised system of farming. The paper first outlines the different types of restrictive policy introduced under the Common Agricultural Policy since 1984 which have affected British agriculture, with special reference to the set-aside of arable land and milk quotas. Results for the rather disappointing first year's uptake (1988/9) of the set-aside scheme are examined, together with the effects of milk quotas in two of Britain's contrasting dairy areas - Devon and Cheshire. Attention then turns to possible non-traditional alternatives (farm diversification) open to farmers in the different types of agricultural area, before the paper reports on the development of farm diversification on the urban fringe of the West Midlands. Results indicate that direct marketing, especially farm gate sales, is the most popular form of diversification. Diversification is biased towards the larger farms with livestock enterprises, although few farmers actively sought official advice before embarking on different 'alternatives'. Whilst helping to raise farm incomes, farm diversification is beset with certain difficulties and unlikely to solve the problem of agricultural surpluses.

REGIONAL TYPES OF URBANIZATION IN THE USSR by Pavel Ilyin,

Kennan Institute for Advanced Russian Studies, Washington, DC 20024

The process of urbanization in the Soviet Union takes place differently in various regions: depite all similarities in political, social and ecnomic systems, there are considerable diffences between regions in historical, economic, demographic, natural and other conditions which affect the process of urbanization. In this paper, regional variations of urbanization are described by characteristics of their dynamics and the results of this process. Regional types of urbanization were revealed on the basis of 1959-1989 Census data and other sources. At the top of urbanization in the USSR are the Baltic republics, which type of urbanization is close to West European. This type is characterized by high economic level, high proportion of urban population, level of life in the countryside which are close to that of the city, with territorial availability of urban culture, and rate of reproduction of the population which is barely positive. At the other pole of urbanization in the USSR is Central Asia, with its low level of economic development. Moslem traditions of high birth rate and big families maintains the highest growth of both urban and rural population in the USSR. The share of urban population there is the lowest in the USSR, and the concentration of population in big cities here is less than in other regions. The level and way of life of urbanites still depend on the countryside to a great extent. Other types of urbanization are also described.

GEOGRAPHY AND COMMUNITY HEALTH CENTER DEVELOPMENT: A WINDSOR CASE STUDY, by Frank Innes, Theresa Hutchinson, and Bette Catton.

University of Windsor, Dept. of Geography, Windsor, ON. N9B 3P4. Canada

In the context of the socialized medical care system in Canada, underserviced areas and populations have been identified. A variety of strategies have been employed to identify such areas and to seek to meet these needs. In the context of Ontario, two vehicles are presently being promoted. Health Service Organizations and Community Health Centers. Both of these strategies involve departures from the billing for services, norm of the system and in the case of community health centers rely on a grass-roots initiation and planning process.

This paper presents a case study of the development of the Sandwich Community Health Center in Western Windsor, Ontario and the role played by geographical analysis in justification for the center and in planning for programme delivery.

BASAL PEAT DATES IN EASTERN CANADA AND MAINE

by T. E. Irwin, Dept. of Geography, University of Toronto, Toronto, Ontario, Canada. M5S 1A1

Analysis of 160 basal ^{14}C dates from peatlands in eastern Canada and Maine showed that basal peat formation has been continuous throughout the Holocene in this region. There are noticeable clusters of dates between 12000 and 9000, 8000 and 3000, and 2500 and 1500 radiocarbon years BP. The first peak is apparently associated with deglaciation, the second with the warmest part of the mid-Holocene in this region, and the third with subsequent climatic deterioration to colder and wetter conditions. Regression analysis with date as the dependent variable showed statistically significant results for both latitude and longitude ($p=0.001$) but accounts for only about 20% of variation in each case. Multiple regression using latitude and longitude as explanatory variables for date was not significant. Suggestions that the majority of basal peat dates in eastern Canada and Maine are associated with cooler conditions are not supported by these data. Basal peat inception regionally may also be a function of vegetative productivity enhanced by warmer conditions and not just retarded decomposition.

THE POLICE TOWNS OF BRITISH NORTH AMERICA

by Engin F. Isin, Department of Geography, University of Toronto, Toronto, Ontario M5S 1A1.

When British North America was settled after the rebellion of the thirteen colonies, the British colonial apparatus was hesitant about the formation of urban communities that were not authorised or governed directly by the colonial authorities. The institution of the town meeting was declared illegal and newly created towns were governed by the justices of the peace in the districts. Yet, inducing loyalty among the subjects and ensuring their allegiance to the British state seemed to require the creation of some form of 'local' political communities. The result was 'police towns' and 'boards of police' which embodied important legal and political principles. The study of these principles and how the colonial apparatus formulated them sheds considerable light upon the emergence of the modern city as a subordinate corporation in the 1830s and the 1840s.

SHOULD THERE BE SPATIAL IMMIGRATION POLICIES IN THE UNITED STATES?

by A. Isserman, Regional Research Institute, West Virginia University, Morgantown, West Virginia 26506.

Laws which change the origins of immigration also change the locational patterns of immigrants within the U. S. Previous research by the author traced the causal chain from immigration laws to national origins to location patterns to regional macroeconomic, fiscal, and labor market consequences of those location patterns. Simulations with NRIES II, an econometric projection and impact model built by the Bureau of Economic Analysis, revealed substantially different consequences of immigration among the states. This paper examines that research and other studies to determine whether an argument can be made in favor of spatial immigration policies. Is it desirable or feasible to provide incentives or in other ways channel immigrants to particular locations within the country, as was done through the provision of land for homesteads? For which level of government, if any, would such a policy be sensible and feasible and under what conditions? Should such a policy be selective among immigrants and, if so, based on what criteria? Also, what level of government should bear responsibility for the costs of public services provided to immigrants? Most importantly, is the case of immigrants any different from that of other residents with respect to these questions? This paper is an attempt to sort out these issues, to identify the conditions under which there ought to be a spatial dimension to immigration policy, and to determine whether those conditions exist.

AN ASSESSMENT OF PASSENGER FLOW FROM THE GAINESVILLE REGIONAL AIRPORT

by Russell L. Ivy University of Florida, Gainesville, Florida 32611.

The potential passenger level of the Gainesville, Florida Regional Airport greatly exceeds the existing traffic generation. Much of the traffic potential of Gainesville's air service market is lost to larger nearby airports with better quality service. Many feel that the loss would not occur if the airport could improve and expand its facilities thus enticing airlines to increase their service out of Gainesville. How great is the effect of this loss to the airport and how does it affect the forecasting of travel demand and airport expansion needs?

This paper assesses the air service market and traffic flows at the Gainesville Regional Airport based on passenger surveys and local travel agency information. The problem of competition with alternative nearby airports will be addressed and the services provided at each will be analyzed. The analysis will look at such issues as access time, air fares, flight frequency, possible destinations and carrier choice. This will be followed by an evaluation of the impact of the traffic loss at Gainesville and a statistically forecasted level of traffic flow at the facility.

TOURISM AND GLASNOST, PERESTROIKA, AND ETHNIC ASSERTION IN ESTONIA

by Tiia Karing, Institute of Economics, Estonian Academy of Sciences, Tallinn Estonia, and Reiner Jaakson, Department of Geography, University of Toronto, Toronto, Canada, M5S 1A1.

Estonia (the Estonian Soviet Socialist Republic) is the most Western-oriented part of the Soviet Union. Physically, it has direct links to Helsinki, Finland, via a four-hour ferry connection. Culturally Estonia is more Scandinavian than Slavic. The strip of four countries on the east coast of the Baltic Sea (Finland and the three Baltic Republics of Estonia, Latvia, and Lithuania) have historically served as a transition zone between East and West.Estonia has one of the highest standards of living in the Soviet Union, and not surprisingly, it is a popular tourism destination for Soviet residents, and serves as a favourite location for retirement. Estonia's low birth rate has resulted in labour shortages which has made it difficult to realize the potential of the highly developed and efficient physical and social infrastructure. As a result, there has been a steady in-migration to Estonia from other parts of the Soviet Union.The country has a strong tourism base, which presently is centred in the capital city, Tallinn, with its well-preserved Hanseatic Old Town. A strong secondary tourism centre is the beach resort of Parnu - very popular with specific groups of Soviets, particularly those in Leningrad. However, there is considerable potential to develop tourism in other parts of the country, such as the island in the Baltic Sea, and to harness specific facilities such as the Olympic Harbour, built in Tallinn to serve the Moscow Olympic Games. Estonia could become a yachting-cruising destination in the Baltic Sea and a gateway to the rest of the Soviet Union.In Tallinn, a flagship tourism facility is the Viru Hotel. Although there are several other hotels, supply of accommodation does not always meet the demand. Despite this, tourism to Estonia is a lucrative hard foreign-currency earning activity being actively promoted both within the Soviet Union and in the West. Inevitably, tourism to Estonia is not independent of the major larger trends in the Soviet Union: perestroika and glasnost. The paper places Estonia in its current geo-political and economic context within the Soviet Union, describes past and current tourism trends, and extrapolates such trends to the future.

GOVERNMENT POLICIES AND AGRICULTURAL DEVELOPMENT IN NIGERIA

by David A. Iyegha, Alabama State University, Montgomery, Alabama 36195-0301

The significance of agriculture in Nigeria and other nations in sub-Saharan Africa cannot be overemphasized. In Nigeria approximately seven out of ten people are dependent on agriculture for subsistence living and income. The agricultural sector of the economy had been the backbone of the country's economic development. However, the government's role in the sector has been that of neglect and exploitation, manifested in inconsistent rural development policies, the result of which has been a weakening of an apparently thriving agricultural economy.

This paper presents the development strategy of Nigeria's policy-makers and the negative sectorial transformation that has taken place since independence. Documents collected from the government, supported by an in situ interview of local farmers during a field work, serve as a basis for the analysis. Results from this information show that Nigeria had a bright agricultural future but was only to be crippled by the country's agricultural policies and development strategy.

The Design and Implementation of An Aerial Environmental Monitoring and Analysis Program for a Nuclear Power Plant by Philip L. Jackson and Greg G. Gaston, Department of Geosciences, Oregon State University, Corvallis, Oregon 97330.

At the request of the Environmental Services Group at Portland General Electric Company, a geographic applications project was designed and implemented to provide a comprehensive approach to remote sensing of potential environmental problems at the Trojan Nuclear Power Plant near Rainier, Oregon. The environmental monitoring consists of a four season aerial surveillance program using medium scale conventional 70 mm color and CIR positive transparency film. Interpretation and analysis of this conventional film by electronic scanning procedure is the principal application of this project, but the concept of an integrated aerial monitoring program using manual and electronic procedures is felt to be a worthy applications contribution in itself. The system proved successful for monitoring seasonal vegetation changes, growth patterns, species composition, and vegetation health and rigor. Broader land use and resource management practices and their influence on vegetation patterns within the Columbia River flood plain and in the adjacent Coast Range were also monitored.

SPATIAL VARIATION IN PRODUCTION: A PRELIMINARY ANALYSIS OF ESTABLISHMENT DATA by Randall W. Jackson, The Ohio State University, Columbus, Ohio 43210, and Philip Israilevich, Federal Reserve Bank of Chicago, Chicago, Illinois 60690.

Inter- and intra-regional variation in production has long been assumed. The extent to which production schedules vary within and across regions and the implications of these variations have largely been ignored until now, however, because researchers have not had access to establishment-level production data. The purpose of this paper is to present the results of preliminary analyses of both national and regional establishment-level materials purchases distributions.

Recently, special access to establishment-level census data has been arranged. This has enabled an assessment of the extent and analytical significance of establishment-level variation in production. Because there are real costs associated with the data extraction and analysis procedures, a subset of all industries was selected for focussed study. The subset was chosen using a combination of methods drawn from the input-output literature. Those industries with analytically significant ties to other industries in the U.S. were determined by identifying (Leontief) inverse-important coefficients. Distributional statistics for these industries' production relationships for the nation and for each census region are presented and assessed. Preliminary findings indicate that the long-held assumption of spatial variation in production is well founded. The paper concludes with implications of these findings for the use of published industry-level data and regional economic models, and with an agenda for future research.

TERRITORIAL CHANGE IN THE NORTHERN UTE RESERVATION: CAUSES AND IMPLICATIONS by Richard H. Jackson, Brigham Young University, 934 Kimball Tower, Provo, Utah 84602

Established in 1861, the Uintah Reservation in eastern Utah was an attempt to relocate Ute Indians from the valleys of the Wasatch Mountains where their traditional summer lands were being occupied by Mormon pioneers. The original reservation contained 3007 square miles (1,924,614 acres). In 1882 the Uncompahgre Ute Reservation of approximately 3021 square miles (1,933,440 acres) was created adjacent to the Uintah reservation for Utes displaced from western Colorado by homesteaders.

After passage of the Dawes Act (1887) the Uncompahgre reservation was opened to homesteading in 1898. The Uintah Reservation lost land to homesteading as well as to the Uintah National Forest (1892) and to reclamation projects to provide irrigation for non-Indian farms.

By the 1940s the 3.8 million acres of the two reservations had been reduced to less than 1 million acres. Since that time 665,000 acres have been returned to the tribe, and recent court decisions have given them greater authority in managing the lands included within the original reservation boundaries. Conflict continues between the Indian and non-Indian residents of the area recognized by the courts as within Indian jurisdiction as the Indians attempt to assert their claim to their historic reservation lands.

ECONOMIC DIVERSITY AMONG THE CHEROKEE IN NINETEENTH CENTURY SOUTHERN APPALACHIA by J. M. Jacobi, University of Tennessee, Knoxville, Tennessee, 37996

Considerable geographic research has been focused on the changes that have occurred as a result of European occupation of the North American landscape, but less is known of the indigenous populations' role in the transformation of the land. By studying settlement patterns, land use activities, economic development, and family diversity of various Indian groups we will improve our understanding of how such occupation affected the success or failure rate of immigrant groups moving into an area. Investigating Cherokee settlement patterns in southern Appalachia supplies some answers to questions about the cultural landscape.

The Cherokee not only adopted European culture traits, but many willingly embraced and successfully emulated the entreprenurial attitude of incoming traders and settlers. Through the use of maps and graphs this paper will analyze and portray the economic differences and/or similarities across diverse family types that existed within the Cherokee Nation prior to their removal in 1838. Scholars support the idea that miscegenation between Indians and Whites led to greater economic progress for mixed blood families. The nineteenth century Cherokee exhibit complex family diversity, but that disparity was only one factor in the complex economic picture of the Nation. Physiographic diversity within the area proved to be at least as important as family type.

PALEOSOLS OF THE OIL CITY INTERFLUVE, UPPER KICKAPOO VALLEY, WISCONSIN. by P. JACOBS UNIV. OF WISCONSIN-MADISON 53706.

The Upper Mississippi Valley Driftless Area is unique for having escaped Quaternary glaciation, allowing the preservation of Pleistocene sediments and soils. This is particularly evident in Wisconsin's Upper Kickapoo Valley. On a tertiary interfluve, an 8.85m thick section contains six soils in eight lithologic units, all paleomagnetically confined to less than 730ka. This study uses soil characterization, clay mineralogy, and soil micromorphology to identify the paleosol parent materials and characterize the weathering history of this section.

Analysis indicates that there were multiple episodes of sediment deposition from either loess accumulation or colluviation from a backwasting sandstone escarpment. Pedogenesis subsequent to each depositional event produced moderately well to well-developed paleosols (fine blocky structured argillic horizons, 7.5YR hues, abundant .7nm and altered 1.4 to 1.7nm clay minerals) compared to the modern, Holocene age soil (moderate, medium blocky structured argillic horizon, 10YR hues, mixed mineralogy). Variations in soil morphology, free Fe contents, and clay mineral asemblages suggest variable rates and/or durations for the formation of each paleosol. The location of the sequence on a tertiary interfluve within the Kickapoo Valley supports the evidence that Driftless Area valleys were incised prior to 730ka.

INDIAN WATER IN THE WEST: ENCAPSULATED SOCIETIES AND POLITICAL DEPENDENCY by Judith Jacobsen, Department of Geography and Recreation, University of Wyoming, P.O. Box 3371, Arts & Sciences Building, Laramie, Wyoming 82071.

An essential part of Native American self-sufficiency in the United States is access to water, because most reservations are located in the arid West. Federal law created Indian rights to water in the early part of the twentieth century, but economic and political realities kept the de jure rights from maturing into de facto use. The history of Indian bargaining for water is uniform--Indians have repeatedly given up parts of their water rights in exchange for federal promises of delivery of water, but the water is seldom delivered on time or in the quantity negotiated. The case of the Navajo Indian Irrigation Project is an example featured in the talk. The Wind River Reservation case and the Ute Mountain Use and Colorado Ute case will also receive attention.

SPATIAL-VARIATIONS IN MORPHODYNAMIC RELATIONSHIPS

by Kathleen A. Jagger[1], Norbert P. Psuty[1], and James R. Allen[2]. [1]Center for Coastal and Environmental Studies, Rutgers University, New Brunswick, NJ 08903, [2]National Park Service, North Atlantic Region, Boston, MA 02109.

At Perdido Key, Florida, the rhythmic outline of the oceanside beaches is a distinctive and persistent pattern. These cusp-like features are found to be spatially related to the morphology of the subaqeous bar. Together they define individual cellular circulation systems which are well developed along the majority of the island.

A morphodynamic characterization of one cell was undertaken using data collected over a five day time-series study. A detailed examination of bar-beach morphology involved sequential profiling, grainsize anlysis, and bedform mapping. Prevailing fluid dynamics were monitored using electromagnetic current meters and pressure transducers deployed around the site as offshore and longshore arrays.

Detailed spatial mapping of morphological characteristics such as slope, grainsize, and bedform associations, in conjunction with fluid charcteristics and variations in current flow, changing energy frequencies, and internal phase shifts, allowed a more accurate characterization of the site.

Spatial variations in reflectivity within the site and observed phase shifts between offshore and inshore locations have significant consequences for classification parameters used in present morphodynamic models. The site can be zoned into areas possessing similar morphodynamic relationships.

THEMATIC MAPPER ASSESSMENT OF POTENTIAL KIRTLAND WARBLER HABITAT

by Mark E. Jakubauskas, Department of Geography, The University of Kansas, Lawrence, Kansas 66045

The Kirtland's Warbler (Dendroica kirtlandii), is an endangered bird species indigenous to northern lower Michigan. For its nesting habitat, the warbler requires stands of jack pine forest of at least 80 acres in size, with tree age between eight and twenty-one years of age, growing on the Grayling soil series. Ninety percent of all warbler nests have been found in stands of jack pine located within the watershed of the Au Sable River.

The focus of this research was to assess the total potential nesting habitat for the species. Landsat Thematic Mapper data were classified and then incorporated into a geographic information system. Algorithms within the GIS eliminated jack pine stands outside the specified age range, on a soil type other than the Grayling series, or of insufficiently large area to provide optimal nesting sites.

Results indicate that this approach can successfully be used to evaluate potential habitat for endangered species. Additionally, this technique may be used to identify sites which may be converted to warbler nesting habitat through the use of selective logging or prescribed burning.

LATE QUATERNARY STREAM CAPTURE, NORTHERN SIERRA NEVADA

by Allan James, Geography Dept., Univ. South Carolina, Columbia SC 29208.

Quaternary stream captures are rare in Sierra Nevada drainages which generally evolved during Miocene and Pliocene volcanic episodes. Preliminary field evidence indicates that more than 300 km^3 was captured from the former upper Bear River by the South Yuba River near Emigrant Gap, California. Capture was apparently instigated when the Bear Valley glacier topped the divide and flowed into the South Yuba. Well-preserved glacial striae, grooves, and *roche moutonnée* on valley walls, bedrock benches, and valley trough bottoms document two ice-flow directions. Glacial ice branched at the capture site and flowed down both valleys at levels well above modern channels. Subsequent channel incision, probably initiated by glacial melt-waters, cut a sinuous gorge about 60 m below the glacially polished and graded surfaces.

Stream capture caused fundamental hydrogeomorphologic changes in the two fluvial systems. (1) Runoff in the captured area is dominated by snow-melt, in contrast to lower elevations where rainfall dominates. Thus, present differences in runoff seasonality between the Bear and South Yuba rivers were probably reversed prior to capture. (2) The South Yuba longitudinal profile has been regraded as former headwater channels incised to present levels in the gorge. High terraces and bedrock benches along the South Yuba may represent pre-capture surfaces. (3) Discharge magnitudes decreased in the Bear and increased in the South Yuba, resulting in *underfit* and *overfit* conditions in the two basins, respectively. Thus, there is a greater tendancy for sediment storage along the modern Bear River than along the South Yuba River which flows through a series of gorges.

SPACE-TIME DIARIES AND TEMPORAL PATTERNS OF URBAN ECOLOGICAL STRUCTURE

by Donald G. Janelle, University of Western Ontario, London, Ontario, N6A 5C2, and Michael F. Goodchild, University of California-Santa Barbara, Santa Barbara, California 93106.

Space-time diary surveys offer opportunities to extend the traditional human ecological study of cities to a dynamic level that takes account of the changing activities and locations of people throughout the day. This is demonstrated through an analysis of 1,256 respondents in Halifax, Canada. The analysis is based on a multi-mode factor analysis -- Harshman's PARAFAC. From the diaries, 37 activity variables were aggregated according to the locations of respondents in 29 subregions for 8 one-hour time periods. This analysis revealed the significance of employment, shopping, non-home entertainment, education, and socializing activities as determinants of diurnal changes in the character of the city's subregions, and it demonstrated their close relationship to the socio-demographic traits of the respondents.

THE GOLF INDUSTRY OF THE SOUTH CAROLINA GRAND STRAND

by Robert L. Janiskee, University of South Carolina, Columbia, South Carolina 29208

Golf course construction began to boom in the South Carolina Grand Strand during the mid-1960s, and has since catapulted the region into the ranks of America's leading golf resorts. Golfers teeing up at more than 50 courses in the greater Myrtle Beach area now play over 2 million rounds and contribute over $60 million to the local economy each year.

Using information gathered from real estate and golf course developers, the hospitality industry, planners, and related sources, this paper describes the major physical and managerial aspects of the Grand Strand's golf industry, explains the factors responsible for the region's emergence as "The Seaside Golf Capital of the World," and speculates about the future of golf-related tourism and real estate development in the coastal Carolinas.

OHIO FIRMS AND THEIR MAQUILADORA EXPERIENCE: AN OHIO PERSPECTIVE

by R. Janson, Department of Geography, Kent State University, Kent, OH 44242

Corporate officials of Ohio firms with a maquiladora plant on the United States/Mexican border were interviewed to evaluate their experience with the program. Open-ended interviews were made in an attempt to estimate both the positive features and the negative features of their involvement. In addition, information concerning the nature of the product lines and the nature of the corporate structure was elicited in an effort to generalize regarding the Mexican connections.

Information of this kind is difficult to obtain, because of the proprietary and strategic aspects of corporate policy. The anecdotal evidence of these interviews is offered to ascertain the significance of the maquiladora program to Ohio firms with headquarters located more than 1300 miles from the Mexican border.

Questions were also raised to determine the spatial origin of inputs to the border plants and the spatial destinations of output. Significant comments on related topics were recorded.

THE DEVELOPMENT OF CARTOGRAPHY AT KANSAS by George F. Jenks, Department of Geography, University of Kansas, Lawrence, Kansas 66045-2121.

I was trained in cartography by Richard Edes Harrison while still a graduate student at Syracuse University. I came to Kansas in the fall of 1949 and spent the first year developing courses and completing the final draft of my dissertation. In the fall of 1950 I developed our first course in cartography and this was soon followed by a course specifically for geology students. My understanding of many of the aspects of cartography was heightened in 1951 when I was awarded a Faculty Fellowship by the Fund for the Advancement of Education. This fellowship enabled me to visit almost every cartography laboratory in Washington D.C. as well as other cartography laboratories in New York and Chicago.

Upon returning to Kansas in the fall of 1952 I completed work on the Kansas Atlas and revised the content of four courses to include concepts gained elsewhere, including ideas from discussions with Erwin Raisz, Ricky Harrison, Arthur Robinson, and John Sherman. These revisions led to the development of "An Improved Curriculum for Cartographic Training at the College and University Level." The department began to attract a larger number of graduate students in the late 1950s and we were authorized to grant doctorate degrees. This influx, plus my interests in research and consulting tasks for the Governor's Conference and the federal Census of 1960, and an increased graduate teaching load occupied my time for several years. Additional personnel and a further increase in graduate students interested in cartography mandated a major shift in course content and assignment through the 1960s.

NUMERICAL ANALYSIS OF MODERN AND PALEO-PLANT COMMUNITIES IN THE WHITE MOUNTAINS, CA-NV by Steven A. Jennings, University of Oregon, Eugene, Oregon 97403, and Wayne R. Owen, University of California, Davis 95616.

Packrat midden analysis, coupled with sampling of modern plant communities has resulted in the compilation of species lists. These species lists represent environmental variation, both presently and in the past. Macrofossil assemblages from 11 middens, dated between 20,000 yr B. P. and 800 yr B. P., indicate changes in plant communities through time. In conjunction with the midden analysis species lists were made for 8 locations, all at midden sites. These sites vary in elevation between 1314 and 3291 m. Species lists were compared statistically in order to examine the relationship between modern and paleo-plant communities

Association analysis of the communities was done using similarity indices, discriminant analysis, and cluster analysis. The relationship between paleo- and modern plant communities was tested using partial least squares regression.

Midden assemblages from the Pleistocene were similar to the modern plant communities at higher elevations. This similarity between communities at greatly different elevations decreased in the Holocene with many of the communities became increasingly similar to modern communities.

REMOTE SENSING OF THE MANGROVE COMPONENT FOR COASTAL ENVIRONMENTAL SENSITIVITY INDEX MAPPING by J. Jensen, E. Ramsey, H. Lin, X. Yang, Department of Geography, University of South Carolina, Columbia, SC, 29208; B. Davis, Science and Technology Laboratory, NASA Stennis Space Center, SSC, MS, 39529; and J. Michel, R.P.I. International Inc., Columbia, SC, 29201.

Mangroves occupy much of the tropical coastline of the world. Unfortunately, there is little information concerning the interaction of electromagnetic energy within the mangrove canopy or specification of which remote sensing systems can provide detailed mangrove classification and/or biophysical information. This paper summarizes the initial analysis of *in situ* and remote sensing data of mangroves near Marco Island, Florida, obtained during the period October 16 - 25, 1988. Helicopter spectroradiometer data for red, black, and white mangroves are presented inconjunction with *in situ* measurements. Classification of mangroves using NASA Calibrated Airborne Multispectral Scanner (CAMS) high resolution data (5 x 5 m with 11 bands) and SPOT HRV XS and Panchromatic data (20 x 20 m and 10 x 10 m) are summarized. Results of extracting 'percent canopy closure' information from the SPOT multispectral data are described. Finally, initial results of modeling the mangrove canopy in the visible and near-infrared portion of the spectrum (.4-1.2 um) are presented. This research on remote sensing of mangroves is part of a larger NASA environmental sensitivity index mapping project which identifies the sensitivity of tropical coastlines to oil spills.

THE SPREAD OF METAL FARMING TOOLS AMONG THE NAVAJO by Stephen C. Jett, Department of Geography, University of California, Davis, California 95616.

The Navajo's original farming tools were of wood and bone, and included the digging stick and weed-cutters or "hoes." Small numbers of iron hoes were traded to the Navajo by Spaniards and Mexicans during the 18th and early 19th centuries; but only with the post-1846 American period did metal tools reach the Navajo in numbers. They were given by the military to Navajo delegations, and were also provided for general distribution. They included hoes, spades, sickles, knives, and axes. For example, at the end of 1859, 274 spades and 360 hoes were issued at Ft. Defiance, Arizona. Hundreds of hoes, spades, and mattocks were handled out at the Bosque Redondo Reservation between 1864 and 1868, and commercially manufactured plows became familiar. After 1868, tools were issued in quantity as annuity goods at the Ft. Defiance Agency headquarters. Other programs succeeded treaty annuities after 1879, facilitated by the arrival of the railroad in 1880. Around 1900, tools and animal-drawn equipment--especially plows--were being issued to reward exemplary farmers. Because these items were distributed gratis, trading posts usually did not carry farming tools until after the give-away programs ceased; but between the world wars, traders began to become the main source of tools.

DEVELOPMENT EFFORTS AND BUSINESS TRENDS IN FINLAND'S RURAL COMMUNES by Harley E. Johansen, University of Idaho, Moscow, ID 83843, Arvo Naukkarinen, Oulu University, Oulu, Finland, and Taina Väre, Oulu University, Oulu, Finland.

During the 1980s, Finland's policy toward regional development has placed increasing responsibility on local municipalities for economic development and the provision of local services and infrastructure. Our study of 101 rural communes, randomly selected from throughout Finland, examines the development goals, strategies, and the organized development efforts of each commune, and corresponding changes in the economic activities in the commune center and surrounding hinterland. The analysis attempts to explain variability in economic development using development efforts along with demographic, locational, and other characteristics of communes as independent variables in a model of business change.

QUATERNARY POLYGENETIC LANDSCAPES: DISCERNING THE IMPRINTS OF CLIMATIC FROM OTHER, NONCLIMATIC FACTORS by D.L. Johnson and C.L. Balek, Department of Geography, University of Illinois, Urbana, IL 61801.

In 1943 the term 'polygenesis' was coined to describe landscapes whose soils had experienced more than one climatic cycle. The concept was expanded in the late 1950s when it merged with k-cycle, pedimentation, and stone line theory. According to these conceptual meldings, climate alternates between unstable phases that produce erosion and accompanying redeposition, and stable phases during which soil formation occurs. Paleosols were defined as polygenetic soils that pass through more than one climatic cycle. Stone lines and the soil mantle above them became prima facie evidence of the pedimentation-pedisedimentation process, and thus a confirmation of landscape cycles.

We have since learned that the real world is less simple inasmuch as other nonclimatic factors, or more broadly, factors, processes and conditions - collectively vectors - can also produce "polycyclic" landscapes. Moreover, soil evolution is ongoing and not limited to "stable" climatic phases. A major task confronting process geomorphology in the next century is to identify and quantify criteria that differentiate climatic from nonclimatic vectors. Among the latter, biomechanical and associated mass-movement processes rank high in fundamental importance.

SEASONAL PRECIPITATION IN SPAIN AND CIRCULATION INDEXES by Daniel M. Johnson, Dept. of Geography; Portland State Univ., Portland, OR, 97207.

The North Atlantic Oscillation (NAO) and the Eastern Atlantic (EA) Index are two measures of the location and intensity of mid-latitude westerlies over the North Atlantic Ocean, the former a sea-level index and the latter upper air. As such, they are potential predictors of seasonal and monthly precipitation in Western Europe. This paper reports on a test of this thesis for seasonal (3-month) precipitation in Spain. Simultaneous and lagged (predictive) correlation coefficients were calculated between both indexes and precipitation at a dense network of climatic stations. For both indexes simultaneous correlations are strong only in the winter season. For the NAO, over approximately two-thirds of the country r-values exceed -0.70 and are statistically significant at the 99% level. Values decay rapidly toward the east (Mediterranean) coast and towards the north (Cantabrian) coast. The negative correlation means that high values of winter precipitation coincide with large negative values of the NAO Index, or weak westerly flow across the North Atlantic. For the fall season, r-values are marginally significant only in the far southwest. In the spring and summer r-values are non-significant at all stations. Lagged correlations, with the NAO Index leading, fail to yield any statistically significant seasonal relationships. Results with the EA Index are similar.

TEMPERATURE CLIMATOGRAPHY OF CENTRAL ILLINOIS by Eric S. Johnson, Associate Professor, Department of Geography-Geology, Illinois State University, Normal, Illinois 61761

Temperature data from a National Weather Service Climatological observation station for the most recent 30 year period (1960-1989) is analyzed. Mean annual temperatures, mean monthly temperatures and mean seasonal temperatures from observations taken at 40°30' N and 89°00' W are examined for trends. Despite the current publicity of a warming world, this data does not support such a conclusion. Rather it supports the results of some GCM that indicate such a mid-latitude location will not share, at least initially, in such warming.

A COMPARATIVE ANALYSIS OF STATE-SPONSORED REGIONAL DEVELOPMENT PROGRAMS IN THE UNITED STATES by Dr. Kenneth A. Johnson, State University of New York, College at Oneonta, Oneonta, New York 13820-4014.

In recent decades, various states in the United States have assumed an active role in stimulating and directing economic growth within their jurisdictions. The traditional position of U.S. states was to allow free market forces to determine regional development patterns; thus, the recent, aggressive involvement of state governments in this field represents a significant departure from the past. These states have developed a vast array of incentive programs designed to induce private enterprise to make particular types of investments in specific, geographic areas. The panoply of incentives includes corporate tax reductions, property tax reductions or deferrals, land contributions, reductions in utility rates, and cut rate long-term, leases. State programs have also been generous in offering infra-structure improvements such as upgraded highway connections, preservation of railroad service, construction of sewers and sewage treatment systems, the creation of industrial parks, and the rejuvenation of port facilities. The purpose of this paper is to report the results of a comparative analysis of these various programs. In particular, this study is intended to determine which programs have been most successful in promoting economic development that would not have occurred in their absence. In addition, this paper will endeavor to identify the economic, environmental and social trade-offs that have been associated with the implementation of these programs. Finally, this paper will investigate the reasons why some states have been much more successful than other states in implementing these programs.

THE ROLE OF REGIONAL ENVIRONMENTAL CHANGE AND CLASS STRUCTURE IN TECHNOLOGICAL CHANGE AND THE DEVELOPMENT OF CAPITALIST RELATIONS OF PRODUCTION WITHIN THE ARTICULATED ECONOMY OF THE DINKA OF THE SUDAN by Mark O. Johnson, Clark University, Worcester, Ma. 01610.

A complex set of processes lie behind the development, among the agropastoral Dinka of Sudan, of nascent capitalist relations of production, and behind the introduction, by these capitalists, of innovations in food production technology. Our goal in this paper is to understand and interpret these processes, an exercise that has both scholarly and applied (developmental) implications. A historical materialist method, based on a theory of articulation of modes of production and employing regional, spatial, and human/environment analyses, guides the investigation of the observed change process. The investigation illustrates the contextual factors that are important to the change process. These include 1) the opportunities and constraints (especially migrant labor, cattle trade, and the growth of marketing centers) resulting from the articulation (linkage) of the lineage society to capitalist economies 2) class struggle within Dinka lineage society over reproductive goods and production resources, and 3) five regional environmental changes, the products of class struggle over resources in neighboring social formations, which negatively impact the Dinka resource base.

THE BUILDING OF A NATION: SOME ASPECTS OF LANGUAGE AND EDUCATION POLICY IN POST-INDEPENDENCE IRELAND by Nuala Johnson, Syracuse University, Syracuse, New York 13244.

In Ireland, in the mid-nineteenth century, Thomas Davis argued that "A people without a language is only half a nation". In this century the central role accorded to a language can be seen in the nation-building projects of post-colonial societies (e.g. Africa and Asia) and in long established bilingual states (e.g. Canada). This paper explores how the Irish Free State and later the Republic of Ireland debated and defined the cultural content of Irish primary school education. In particular, the Irish language policy within the education system is investigated. The process of implementing a set of education policies that would bind together the diverse regions of the country into a common politico-cultural entity and would provide a legitimate basis for the assertion of a unique Irish nationality is examined.

BIOGEOGRAPHY AND GEOMORPHOLOGY OF LATE-PLEISTOCENE MEGAFAUNAL REMAINS AND POTENTIAL PALEOINDIAN ASSOCIATION IN THE EAST-CENTRAL GREAT PLAINS by William C. Johnson, University of Kansas, Lawrence, KS 66045.

Recorded finds of late-Pleistocene/early-Holocene mastodon, mammoth, and bison remains in Kansas provide an approximation of their true distribution for the time period. Mastodon material is largely confined to eastern Kansas, which is consistent with evidence for mixed coniferous and deciduous woodland there. Mammoth finds occur widely, but nonuniformly. They are concentrated in the Smoky Hills region, northcentral Kansas, reflecting the dominantly grassland environment of the western 2/3 of the state. Bison exhibits no east-west gradient, indicating the prevalence of grassland.

Individual geomorphic settings can be alluvial or loessal. Pre-10,500 yr BP alluvium commonly contains well-preserved faunal material, but is limited in extent due to late-Pleistocene entrenchment. The fill has persisted along valley sides in eastern Kansas and in the west where low runoff has minimized sediment removal from valleys. Loess deposits have buried deeply late-Pleistocene faunal remains in much of central and western Kansas. Finds there are usually deeply buried, often in association with water and/or salt sources.

The rarity of paleoindian sites relates to erosion or deep burial by alluvium, and accumulation of loess on uplands and valley side slopes. Predictive models for locating in situ megafaunal remains and paleoindian sites are essentially the same, geomorphically, in the east-central Great Plains.

THE GREEN PARTY AS A NEW ELECTORAL FORCE IN GREAT BRITAIN? by R.J. Johnston, Department of Geography, University of Sheffield, Sheffield S10 2TN, UK, and C.J. Pattie, Department of Geography, University of Nottingham, Nottingham, NG7 2RD.

Green issues rose rapidly on the British political agenda in 1988 and 1989. The elections for the European Parliament in June 1989 provided an opportunity to test their salience for the electorate, with the Green Party contesting every seat in Great Britain. The Party won 15 per cent of the votes (but no seats), which suggests considerable support for 'Green policies'. Evaluation of the geography of that vote, in the contemporary political content, explores the likelihood of continued support for (a) the Green Party and (b) green policies.

THE STATE, POLITICAL GEOGRAPHY AND GEOGRAPHY by R.J. Johnston, Department of Geography, University of Sheffield S10 2TN, UK.

The growth of interest in the state in recent years has stimulated both a renaissance for political geography and the greater integration of that subfield within the discipline of geography. The central role of the state apparatus in both capitalist and socialist societies is now widely appreciated. Increasingly appreciated also is that the necessity of a state apparatus does not lead to a functionalist interpretation of what the state must be. Geographical variations in the nature of the state apparatus are substantial. This paper comprises case studies focusing on those variations: the geography of liberal democracy: the geography of structural violence: and the geography of the local state.

SUBSUMPTION AND THE FAMILY FARM IN NEW ZEALAND by T. Johnston, Department of Geography, Massey University, Palmerston North, New Zealand.

Subsumption of the family farm by large blocks of captial has received considerable attention in the literature. It has been argued that subsumption impairs the ability of farm operators to independently make decisions which affect the destiny of their businesses. Although this hypothesis is a theoretically informed one, as well as being intuitively appealing, it has yet to be well scrutinized empirically.

In this paper, data from a sample of New Zealand family farms are used to test the idea that subsumption reduces management control. Individual farm units are classified according to the degree to which they are subsumed, and analyses are undertaken to determine the relationship between subsumption and control over decision making.

LOCAL INTERESTS AND STATE TERRITORIAL STRUCTURES: SOME CONCEPTUAL AND EMPIRICAL ISSUES by Andrew Jonas, Graduate School of Geography, Clark University, Worcester, MA 01610

The recent revival of political geography provides an opportunity to examine from a critical-theoretical perspective different aspects of the spatiality of the state. While recent work on topics such as the local state and locality-based political responses to industrial restructuring have sensitized researchers to contextual analyses of the state, comparatively less attention has been devoted to the territorial organization of the state in general.

This paper attempts to conceptualize the state as a contested social relation whose territorial structure is reproduced/transformed through the conjuncture of a variety of mechanisms. These mechanisms are situated with respect to structures of social relations into which local interests are inserted. Because of such relations as their fixed investments and localized exchanges, local interests are 'territorially dependent'. Territorial dependence may cause local interests to engage in a variety of collective activities to protect their territory-specific patterns of reproduction. Some activities may lead to the transformation of state territorial structures. The reproduction/transformation of state territorial structures is contingent upon the outcome of conflicts between and amongst local interests. These conceptual issues are discussed through empirical case studies based in North American metropolitan areas.

ENERGY SECURITY FOR DEVELOPMENT: HOW MUCH ENERGY COULD MAJOR LATIN AMERICAN COUNTRIES CONSUME BY 2000? by Donald W. Jones, Energy Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831-6205.

Continued industrialization, urbanization, and per capita income growth in Argentina, Brazil, Colombia, Mexico, and Venezuela will require increases in per capita energy consumption. The least urbanized of these countries had 2/3 of its population urban in 1985; the shares of their GDP coming from the industrial sector approach 40% already; income growth has been negative in all but Colombia since 1981 or 1982, and the prognosis for a return to growth rates of the 1960s and 70s during the rest of the century is not sanguine. Nonetheless, by 2000, aggregate national energy consumption in each of these countries could exceed 1985 levels by 35-38% in Argentina to as much as 62-68% in Mexico. Roughly 2/3 of the increase would come from population growth, so simple economic policies may have limited scope to restrain this energy consumption growth.

The overhang of foreign debt in all five countries but Colombia casts serious doubt on their ability to make large energy investments that currently are in planning stages, such as major hydroelectric facilities in Argentina and Brazil and pipeline and oilfield investments in Venezuela and Mexico. Despite its large, alcohol fuel program, subsidies for which are withering as part of general, government budget-cutting, petroleum still accounts for 30% of Brazil's import bill, leaving it vulnerable to oil price shocks.

Security of these countries' development depends on their ability to secure enough modern energy to power their economic growth and industrialisation and on their ability to grow rapidly enough to pay for those investments.

AGROECOLOGICAL CHARACTERIZATION AND THE CGIAR CENTERS by Peter G. Jones, Centro Internacional de Agricultura Tropical (CIAT),Colombia

Accurate information on the environments in which crops are grown is essential for the CGIAR centers to meet their goals of increasing food production and alleviating rural and urban poverty. This paper discusses the data and methods used by the centers for agroecological characterization(AEC) to fulfill both descriptive & prescriptive functions. AEC requires data on climate, soils, crop distribution, cropping systems, and the socioeconomic constraints of farmers. The CGIAR centers have used subsets of these data in various ways. Some have started with agroecozone maps to subdivide their target areas (e.g., the FAO agroecozones and the Holdridge Life Zone Maps). Another approach starts from crop distribution & uses this to create an inventory of environments in which the crop is grown. Crop models are useful for more detailed predictive purposes, and some centers are working on stochastic weather models to assess the risks involved in agricultural practices. Environmental databases greatly assist in the process, and Center scientists are collaborating in the development, standardization, and exchange of these data. Much of the work done to the present has concentrated heavily on the physical environment. It is clear that this falls far short of the ideal. The socioeconomic conditions and constraints of the farmer are of paramount importance, and the challenge today is to incorporate these considerations into the databases, analyses, and mappings used by the Centers.

THE AMERINDIAN CONTRIBUTION TO TRADITIONAL SOUTHERN CULTURE AND REGIONALISM by Terry G. Jordon, University of Texas at Austin, Austin, Texas 78712

To a much greater extent than is generally recognized, racial mixing between whites and Indians, as well as between blacks and Indians, occurred in the United States, especially in the South. A great many such mestizos were absorbed free of ethnic status into the population of the South. The 1980 census was the first to suggest the extent of such mixing.

The genetic mixing was accompanied by a cultural exchange, in which elements of the Indian way of life were absorbed into Southern culture at large. In the traditional rural culture of the South, Amerindian influence can be detected in foodways, diaglect, funerary practices, folk medicine, hunting, and religion. Many such influences relate to adaptive strategy. The Amerindian imprint is far weaker in many other parts of the country, where racial mixing was less vigorous, with the result that Southern regionalism is based partly in native American culture.

A COMMENTARY ON THE URBAN EXPLOSION OF KATHMANDU, NEPAL by Tulasi R. Joshi, Fairmont State College, Fairmont, WV 26554.

Kathmandu, the capital city of Nepal, is the largest city of Nepal. The population of the greater Kathmandu area including two other adjoining cities is over four times greater than the population of the next largest city in the country. The population growth of this Third World city over the last four decades has been phenomenal, each succeeding decade exceeding the growth rate of the preceeding one. While the metropolitan area is sprawling in all directions, the task of achieving the urbane quality of life taken for granted in Western cities, seems to be getting nowhere here. Each day as the urban areas continue to grow, it only makes the work more difficult for its future planned growth, since the physical development plan for the metropolitan area seems put on hold.

In this context, this paper will examine the pattern of urbanization in Nepal with special reference to the greater Kathmandu area, summarize the consequences arising from the unplanned growth, review the effort of His Majesty's Government of Nepal for the physical development planning of the Kathmandu Valley, and provide effective concepts for formulating and implementing a master plan for the future growth in the very unique land tenure environment of Kathmandu.

MOSCOW AND MOSCOW REGION: TERRITORIAL CONFLICTS by Mikaella Kagan, 35 Tudor Street, #14, Lynn, MA 01902

The paper describes conflicts in Moscow and the Moscow Region which have arisen on a territorial basis. Two kinds of conflicts are discussed. First is that between governmental departments of Moscow and those of the Region. Their main cause is a territorial expansion of Moscow related to a lack of land available for Moscow residential, commercial and industrial development. Actually, this lack is explained by extensive land use within Moscow's territory. The changing character of Moscow's land use is described by population density and other characteristics.

The second group of conflicts are between the populations of Moscow and the Region. The main cause here is the differences in the level and way of life. They are shown by comparison of the weekly circuits of two typical representatives of the populations -- Moscovites and commuters. Because of the problem of deficits, the commuter becomes a rival of the Moscovite in the sphere of distribution of food, consumer goods and services. In the Moscow Region, conflicts are going on between Moscovites entering for the purpose of recreation and the local population. The main reason is social antagonism between different social groups of the population, which determines differences in way of life, attitude to land, etc.

The evaluation of the conflict by different population strata is described on the basis of interviews.

NATIONALISM: THE CHALLENGE TO SOVIET FEDERALISM by R. Kaiser, Kennan Institute, Washington, DC 20024-2518

Since 1986 there has been a dramatic upsurge in overt expressions of nationalism in the USSR. The principle goal of nationalists appears to be to gain greater or exclusive political control over the territory claimed as their homelands. Because the federal system is based primarily on the geographic extent of ethno-national homelands, this "national territoriality" has serious implications for the future of Soviet federalism, as well as for the prospects of perestroyka.

In the past, it was accurate to describe the Soviet political system as federal in form, but unitary in essence. Political power was highly concentrated and centralized in a hierarchically structured Communist Party. This has changed gradually over time, increasing to some extent the political autonomy of the union republics. This limited devolution has also normally meant increasing political decision-making authority for nations in their homelands. Still, up to 1985 political power remained primarily within the Communist Party.

The evolutionary pace of change occurring in the past has given way to a more accelerated rate in the Gorbachev era. This dramatic change is an unintended consequence of glasnost and perestroyka, which have had the effect of reducing the penalties for overt displays of nationalism in the system. The national territoriality evident in the USSR is a force seeking to bring the state's governmental form into alignment with the confederal system envisioned in the Soviet Constitution.

MORPHOLOGY AND ORIGIN OF ARMORED MUD BALLS ON REVADANDA BEACH (INDIA) by Vishwas S. Kale and Anita Awasthi Department of Geography, University of Poona, Pune PUNE 411 007 (India).

The morphology and evolution of armored mud balls (AMB) in the intertidal zone on the Revadanda beach have been studied. The analysis of the shape, size and orientation of the AMB for the monsoon, post-monsoon and pre-monsoon seasons was undertaken and samples of mud and armor were collected for textural and shape analysis. The study reveals that the tidal action shapes angular chunks of plastic mud into sub-rounded to rounded mud-balls by back and forth rolling motion on the sandy beach and the core is armored by accretion of sand and small pebbles during transit. The chunks are released from the mud zone (lower beach) during the dry season (post-monsoon) and by the end of summer (pre-monsoon) the mud balls are reduced to smaller size.

The formation of mud balls is associated with "shore metamorphosis" of the Revadanda beach, from sandy beach to muddy beach.

BIOCLIMATOLOGY by Laurence S. Kalkstein, Environmental Protection Agency, Washington, DC 20460.

Geographers are only beginning to make a significant impact in the field of bioclimatology, which has been previously dominated by meteorologists, biologists, and agricultural specialists. As a group, contributions by North American geographers are severely underrepresented in mainstream bioclimatological journals such as the International Journal of Biometeorology and Agricultural and Forest Meteorology.

There are several areas where geographers are gaining influence in the field. For example, there is disagreement about the relative significance of numerous small weather perturbations versus a single extreme weather event upon the dynamics of biota. In addition, there is considerable research by geographers on the impact of climate upon plant phenology. Finally, the recent interest in anthropogenic-produced global warming has spawned research by geographers on the potential future impact of climate on forests, animal populations, and human health.

LANGUAGE AND MIGRATION IN CANADA: DATA FROM THE 1986 CENSUS by David H. Kaplan, Geography Department, University of Wisconsin, Madison, WI 53706.

Studies conducted by the author have confirmed that migration patterns among Canada's English and French speaking populations differ significantly. In general, English speakers avoid French Canadian regions entirely, whereas French speakers within English Canada are more likely to move to those regions affording the strongest economic opportunity, but which also offer a favorable linguistic environment. This paper explores these tendencies statistically, so as to determine the extent to which economic, linguistic, and amenity factors influence the decision to migrate. Particular attention is paid to how these factors may vary by age and gender, and to how the migration patterns among "Other" speakers (those people who claim neither English or French as a mother tongue) differ from the two main language groups. Conclusions are drawn as to how this may affect Canada's demographic balance in the future.

THE MAKING OF A EURO-CANADIAN IDENTITY AMONG INDIANS ON THE NORTH-WEST COAST by Paul Kariya, The Department of Indian Affairs and Northern Development, Ottawa, Ontario K1A 0H4.

Contact between indigenous and Euro-North American cultural systems and economies have by and large left the Indian people of North America in a disadvantageous position. Today, no other ethnic or racial group is as identified with the effects of post-colonialism as Indians are. Living on reserves or reservations, the litany of negative socio-economic indicators of level of living are monumental: poor housing, welfare dependency, alcoholism, high unemployment etc. All this has served to create a particular image of the Indian in the eyes of academics, politicians, government administrators, the media and general public. The Indian has been created for study, policy, programs, sympathy or disdain.

In this paper, I attempt to present a view from the other side. As much as an outsider can, by using participant observation information, my objective is to examine the making of a "white" or Euro-Canadian image by the Indian. The data is drawn from my experiences on the northwest coast of Canada.

Despite the problems of impact and the dominance of one group over another, one finds that Indian people have not been passive in the face of change.

GEOGRAPHIC APPROACHES TO GLOBAL ENVIRONMENTAL CHANGE
Roger E Kasperson and Colleagues
Graduate School of Geography, Clark University

As studies of the human dimensions of global environmental change develop, geographic approaches hold a high potential contribution. To begin, geography has a well established tradition of nature-society studies, a product of the discipline's bridge role between the natural and social sciences. Approaches in geography that appear particularly promising for research on global change include cultural and political ecology, landscape dynamics, hazard analysis spatial analysis, and regional studies. This paper explores the potential of each of these for particular insights into global change processes. Attention is also given to clarifying the major types of global change that studies of the human dimensions need to address.

IN THE NATURE OF THINGS: THE ENVIRONMENT AND EVERYDAY LIFE by Cindi R. Katz, Center for Human Environments, City University of New York, New York 10036, and Andrew Kirby, Department of Geography and Regional Development, University of Arizona, Tucson, AZ 85721.

It is argued by Giddens that nature is an instrumental object within both pre-capitalist (class-divided) and contemporary (class) societies. We possess a contradictory relationship to nature, not only on the philosophical basis that we have an ability to conjecture about our world (a second nature), but also because material change has always depended upon the exploitation of natural goods. In short, the commodification of nature under capitalism is but a recent extension of the much longer-standing feudal relation, that saw an interdependent exploitation of both human and natural goods.

Giddens has done little to extend these fundamental ideas, although FitzSimmons is correct to remind us that an understanding of the social production of nature remains a crucial project. Yet there are, too, various dimensions to this insight, and our paper chooses to focus upon one specific relation, namely the way in which nature is situated in our collective lived experience, or everyday life. As Bourdieu observes, there are explicit links between the process of habitation in place and the social habits that ensure the re-creation of the collective. Employing examples from our work on the social construction of risk in contemporary society, we show how nature has thus a crucial standing in the patterns of everyday life.

THE POLITICAL STATUS OF JERUSALEM IN A HISTORICAL CONTEXT: ZIONIST PLANS FOR THE PARTITION OF JERUSALEM IN THE YEARS 1937-1938, by Yossi Katz, Department of Geography, Bar-Ilan University, Ramat Gan, Israel 52100

During the Mandate period in Palestine (1922-1948) there were several international proposals for a solution to the prolonged Arab-Jewish conflict by means of a partition of Palestine into two states, Jewish and Arab. In the two main proposals - one from the British Royal Committee in 1937 and the other from the United Nations in 1947 - Jerusalem and its surroundings were not included in either of the states, but received a separate and unique international status. The holiness of Jerusalem to the three main religions, and the place it holds in the world's consciousness in general, were the main reasons for this special status.

The aim of this paper is to examine the Zionist reaction to the Royal committee's plan concerning Jerusalem, and to analyse the proposal that was suggested by the Zionists on this issue.

The Royal Committee's plan had been accepted in principle by the Zionist institutions, but not without reservations. Among them was the question of Jerusalem. Zionism, for ideological-national reasons, could not accept that the Jewish state would remain without Zion. Political pragmatism brought the Zionist leadership to give up the demand for the whole city and suggest its partition. The western part, would be part of the Jewish state, and the eastern part, would be part of the Mandate government. In order to prove the practicability of their plan, even though they were talking about partition of an urban area into two different states, the Zionists based themselves on the assumption that there would be a great deal of cooperation between the two cities, and gave examples from the world.

SHARING THE CONTINENT: WOMEN AND MEN IN WESTERN NORTH AMERICA. panel organized by Janice Monk, University of Arizona, Tucson, AZ 857[illegible] and Jeanne Kay, University of Nebraska-Lincoln, Lincoln NE 6858[illegible]

European expansion overseas has been one of the most powerful and productive themes in historical geography, but it is one where women and minorities were often overlooked. This panel discussion explores ways for western U.S. and Canadian historical geography to incorporate new information and perspectives about less visible participants in the settlement process. Speakers all have published or have research in progress in the historical geography of women or Indians of the West. Panelists will discuss their own research findings; review pertinent literature from women's history, contemporary geography, and ethnohistory; and recommend directions for more balanced future research in North American historical geography.

AVALANCHE CLIMATE AND VARIATIONS IN THE WESTERN UNITED STATES by Paul A. Kay, Department of Geography, University of Nebraska, Lincoln, NE 68588

Avalanche frequency varies across the western United States in relation to climate and snowpack characteristics. Cluster analyses of 12 monthly avalanche and climate variables recorded at 11 ski resorts for 16 years confirm systematic spatial variations. Coastal ranges have frequent avalanches in deep, dense and warm snow, whereas interior ranges have infrequent avalanches in colder, less dense snow. Intermountain ranges are intermediate, but sometimes more coastal or interior, in character. Discriminant analysis classifies the record of Alta, Utah, to identify months when conditions were more like the coastal or interior ranges. Composite difference maps of 700 mb heights show that the avalanche character of Alta is related to orientation of mean anomaly flow. Flow from the southwest brings wetter snowfall and milder temperatures, and avalance character is more coastal.

HYDROCLIMATIC VARIABILITY ON THE GREAT PLAINS by Michael J. Keables, Department of Geography, University of Denver, Denver, Colorado 80208-0183.

The high demand for water resources in the Great Plains necessitates a thorough understanding of the spatial and temporal variability of the hydroclimatology of the region. Paramount to the investigation of hydroclimatic variability is the identification of associations that exist between atmospheric circulation patterns, precipitation, and streamflow within the major drainage basins.

This paper will accomplish two main objectives concerning the hydroclimatic variability on the Great Plains during the period 1950-1985. First, the dominant spatial associations of midtropospheric circulation patterns and the hydrologic patterns (precipitation and streamflow) are quantitatively identified using principal component analysis of mean monthly 500 mb heights over the North American sector, monthly total precipitation for numerous stations in the Great Plains, and mean monthly stream discharge for the larger basins in the Missouri, Arkansas, Red, and White River basins. After the dominant spatial associations have been identified, the temporal variability of the various associations is presented using the time series of the component scores for each dominant circulation-hydrology component.

THE ROLE OF UTOPIAN THINKING IN AMERICAN ARCHITECTURE AND PLANNING, by Artimus Keiffer, Kent State University, Kent, Ohio, USA, 44242.

The contemporary visual landscape is a synthesis of ideas and traditions dating back many years before the first settlers reached American shores. Many of those first immigrants endured the hazardous migration to a new land to develop their various ideas regarding a social utopia on this planet. It is important to understand that their ideas concerning industrialization, inventiveness, home and family have, and continue to, shape our landscape.

Although religious reformers and their settlements continue to dot the map, they are mere reflections of early utopian ideals. The design of surviving house types and town plans to be used communally and socially, give us insight into a world of celibacy, functionalism and purpose.

"A HARD RAIN'S A'GONNA FALL?" RHETORIC, DISCOURSE AND POLITICS OF INTERNATIONALIZATION IN LOS ANGELES by Roger Keil, Johann Wolfgang Goethe-Universitaet, Frankfurt am Main, West Germany.

Scholarly and public rhetorical figures and images tend to liken the internationalization of cities like Los Angeles to a process of supra-natural quality, best captured in the metaphor of "rain". This metaphor usually implies the notion of transnational capital descending on compliant or defiant local communities unable to alter their fate. This paper will take a different approach and show that the internationalization of Los Angeles has to be understood as a process involving the purposeful activity of actors on the local level. Internationalization, then, is viewed as a discourse and a political struggle rather than a one-sided affair. Specifically, it is a process of the destruction and the reconstruction of community in an age of the globalization of the American economy.

A theoretical and conceptual discussion that critiques common definitions of internationalization will be followed by a selection of cases from the current restructuring of Los Angeles. Presenting recent data collected on the city's internationalized communities, I will argue, that the internationalization of the city redefines relationships of class, race and ethnicity through the politics of restructuring. The paper will conclude with an analysis of the political topography of "multicultural" Los Angeles.

FREQUENCY AND MAGNITUDE OF IMMENSE RAINSTORMS IN NEW ORLEANS by Barry D. Keim, Louisiana State University, Baton Rouge, Louisiana 70803.

Proximity to the warm waters of the Gulf of Mexico expose the city of New Orleans to high precipitable water vapor levels for frontal and convective precipitation and disturbed tropical weather. For this reason, immense rainstorms have historically plagued the city. New Orleans faces a unique problem because it is encircled by an artificial levee system that protects the low-lying city from storm surges and high levels of the Mississippi River. Paradoxically, the "flood-protecting" levees encourage urban flooding when precipitation within the levee system exceeds the runoff pumping capability of the Sewerage and Water Board of New Orleans.

Recent heavy rainstorms (e.g., April 1988, September 1986, and April 1983) accompanied by media attention given to global warming have raised concerns that climate regimes may be changing and that excessive rainfall events in New Orleans may be increasing in frequency and magnitude. This paper examines the historical precipitation events in New Orleans from the nineteenth century to the present. Storm events of a magnitude greater than or equal to five inches are investigated in regard to changing frequencies and magnitudes. In addition, the seasonality, synoptic weather situations, and geographical patterns of the storms are discussed.

TEACHING GIB - GEOGRAPHY OF INTERNATIONAL BUSINESS - AS GENERAL EDUCATION by William F. Keinath Jr., University of Central Arkansas, Arkansas 72032.

As a part of its general education program the University of Central Arkansas requires of all students in their senior year that they elect from a group of courses, designated the Senior General Education Electives, one course for which they receive three hours of general education credit. The geography department participates in this program by offering an elective entitled "The Geography of International Business" or GIB. The rationale for such an offering comes of course from what is perhaps the most singular event to have occurred in the latter half of the twentieth century - the globalization or internationalization of the domestic economy. But what the course emphasizes is that this development in its most simple terms has transformed the cultural geography of the world into a new cost of marketing and production defined as the cost of operating a business in a foreign cultural setting in both the societal and work environments.

This elective is aimed at two groups of students on the campus - majors in the College of Business and those students in the College of Education who expect to be teaching high school courses in "Global Studies." The paper outlines the content of the course as well as the methods that are used in its presentation. For the business major the emphasis is on the cultural geography of the world - something of which they can be both ignorant and hostile. For the global studies enthusiast the emphasis is on the engine that made it all happen-the technological and economic factors that make global marketing and production desirable.

MAPPING FOR TOURISM: PAST, PRESENT, FUTURE by C. Peter Keller, Department of Geography, University of Victoria, Victoria, British Columbia, V8W 2Y2 and R. W. Butler, Department of Geography, University of Western Ontario, London, Ontario, N6A 5C2.

In this paper we will examine the past, present and potential future relationship between cartography and tourism.

The traditional analog map has been used as an effective means of communicating tourism related information, information concerning the distribution of tourism attractions and tourism related infrastructure as well as information about the size, nature and scale of economic, social and environmental aspects of tourism. These relationships will be examined in an international context.

Recent advances in computing technology have led to considerable change in the state of the art of cartography, including the popularization of digital geographical information systems. The potential roles of digital cartography and geographical information systems to tourism will be examined.

INTERNATIONAL TELECOMMUNICATIONS: SHARING THE GLOBAL VILLAGE? by A. Kellerman, University of Haifa, Haifa 31999, Israel (on visit at the University of Maryland, College Park, MD 20742-8225).

This paper presents an analysis of data on the most frequently called countries from several countries worldwide, collected by AT&T for the years 1977-1988.

It was initially assumed that the evolution of the global economy during the last two decades would have caused tighter telecommunications ties among the seven largest industrialized nations at the expense of more traditional ties, reflecting cultural-linguistic relations. Similarly it was assumed that smaller nations would present increasing telecommunications ties with the "seven big".

The data present, however, a rather slowly changing system in which cultural ties are still more important than economic ones in many cases. This is true especially for West Germany, and for the smaller "junction" nations in Europe (Switzerland, Netherlands and Belgium). The only country in which telecommunications ties strongly reflect economic relations among the "big seven" is the U.S., but even there cultural contexts find their expression in Britain's heading of the list.

Generally, modern international telecommunications reflect a mixture of basic and changing economic ties, geographical location, cultural-linguistic and historical relations, and modern labor-migration realities.

FROM THE PASTORAL TO THE PROMETHEAN: GIANT POWER IN THE PACIFIC NORTHWEST AND THE RHETORIC OF THE ELECTRICAL SUBLIME by Patricia Kellner, Department of Geography, Univ. of California, Los Angeles.

In The Machine and the Garden Leo Marx described how, during the industrialization of the United States, the American version of the pastoral ideal became embroiled within a romantic conceptualization of 19th century technology. The sublime aspects of the pastoral environment or "middle landscape" became assimilated into "the rhetoric of the technological sublime," allowing the process of industrialization to take on spiritual or transcendental qualities that had previously been attributed to landscape.

I will discuss a 20th century transformation of the pastoral ideal -- its metamorphosis into the rhetoric of the "electrical sublime." This took place in the Pacific Northwest in the 1930s, during the era of Giant Power or massive hydroelectric development, when aspects of the sublime were attributed to both nature and electrical technology. Electricity, like the railroad and steam driven manufacture before it, was to be the means; the region, or middle landscape the medium; and a decentralized economy and more democratic social order based on abundant energy (rather than on abundant fertile land, as in the agrarian version of the pastoral myth) was to be the end result. The machine in the garden was no longer the railroad, it was the dynamo. This new, promethean version of the pastoral ideal did not imply a complete abandonment of the older vision of the "middle landscape," instead it offered the hope of preserving, or more accurately, recreating that balance between the rural and the urban, between agriculture and manufacture, between nature and civilization. Abundant, cheap energy, made available on a regional scale, was expected to help preserve regional autonomy while simultaneously integrating an isolated region into the national economy.

SPORTS SHRINES AND SECULAR PILGRIMAGES by Surinder Bhardwaj, Kent State University, Kent, Ohio 44242, and Michael Kelsey, Kent State University, Kent, Ohio 44242.

Emotion generated by sports is a significant underlying reason for many people to undertake travel in the United States. Intense attachment to sports and to the related symbols, has resulted in the development of a secular pilgrimage type activity at certain places, which may be described as sports shrines.

This paper examines the phenomenon of sports shrines in the United States in the context of American cultural values and symbols. The paper will develop criteria for places to be considered as sports shrines and show their distribution. Empirical data from one "sports shrine" will be analyzed to show the degree of attachment to the selected place and to bring out some comparisons with a religious pilgrimage. Thus, sports generated travel behavior will be typologized as one of a variety of emotive spatial behaviors.

THE DESERT IN "LAWRENCE OF ARABIA": BACKDROP OR ACTOR? by C. Kennedy, California State University, Hayward, California 94542

The desert has since early times been perceived both as wasteland and as crucible for intense experience. Landscape cliches and standardized images associated with deserts abound in movies. Current examples can be found in "Star Trek V: The Final Frontier" and in "Indiana Jones and the Last Crusade." In "Lawrence of Arabia" the desert is more than mere backdrop. The desert landscape is a powerful character with whom T.E. Lawrence interacts.

Through an investigation of T.E. Lawrence's writings, book reviews, reviews of the newly released movie "Lawrence of Arabia," as well as a personal analysis of the movie, person-place relationships are examined and placed within a transactional framework.

BAYES-ADJUSTED CHOROPLETH MAPS by S. Kennedy, University of Vermont, Burlington, Vermont, 05405

A method for producing Bayes-adjusted ratios for choropleth mapping is presented. The theory and utility of making this adjustment for unclassed choropleth maps as well as for classed choropleth maps is explored as an alternative to conventional map classification algorithms. Examples are presented using female breast cancer data from the San Francisco-22Oakland SMSA and suicide, divorce, and infant mortality ratios for the United States for 1980.

A NINETEENTH CENTURY INDIAN HILL STATION AS SYMBOL OF THE RAJ by Judith Kenny, Syracuse University, Syracuse, New York 13210.

This paper examines the interrelationship between the concepts of ideology, political power and place by focusing on the development of a summer capitol in the southern Indian hill station of Ootacamund. More specifically, I argue that Ootacamund can be viewed as a symbol of the British Raj. In 1884 thirty thousand residents of the Madras Presidency petitioned Parliament to halt the annual exodus of colonial government to this remote and sparsely populated hill station. What had begun earlier in the century as an unofficial two month retreat from the summer heat of the plains had become an official migration. As highlighted by the petitioners, the separation of the rulers and the ruled took its most extreme form in the summer governments based in the hills. Focusing on this 1884 debate, I evaluate the dominant ideologies concerning the "native" and government in late nineteenth century colonial India and explore the influence of the hill station in structuring political beliefs and social relations within the Madras Presidency.

STATE ATLASES: FUNDING SOURCES AND THEMATIC CONTENT by Robert B. Kent, Department of Geography, University of Akron, Akron, Ohio 44325 and Thomas J. Tobias, Department of Transportation, State of New York, Albany, New York 12232.

This study examines the content of state atlases produced between 1970 and 1986. It seeks to determine if the primary sources of atlas funding, private or public, influence thematic content. Overall, maps portraying economic conditions, the physical environment, and population dominate, accounting for over 80 percent of all thematic content of state atlases. Thematic content demonstrates modest differences with respect to funding sources, with publicly funded atlases devoting more attention to introductory, physical, and cultural topics. Privately funded atlases give more emphasis to population, industrial, and agricultural themes.

THE AFRICAN REFUGEE CRISIS: THE LONG AND SHORT OF IT

by Martin S. Kenzer, University of Southern California, Los Angeles, California 90089-0663.

By January, 1965, conservative estimates detected well over 1/2 million refugees in sub-Sahara Africa alone; within two years the figure had jumped to nearly 3/4 million (Hamrell 1967, 14-15). A more comprehensive appraisal indicates that there were almost 1 million by 1966 (Brooks and El-Ayouty 1970, 295). The continental total definitely surpassed 1 million by 1970 (Rogge 1987, 43), doubling to at least the 2 million mark eight years hence (Kibreab 1985, 22). Rogge (1977, 188) reported that "nearly half a million" refugees were present in the mid-1970s in Zaire alone. Since the late 1970s, the African refugee population has exploded, most notably south of the Sahel. According to the U.S. Committee for Refugees, the total number of African refugees in need of assistance in 1988 exceeded 4 million (USCR 1989, 32-33); not included in this figure were "internally displaced" Africans, estimated to be between 9 and 13 million; which represents well over 1/2 of all such peoples worldwide (see USCR 1989, 23 and 34; Refugees 1988a). Clearly, the situation is horrible at best, and, even though the "UNHCR operates a large programme in Africa, which absorbs almost 50 percent of the organization's total assistance budget" (Refugees 1988b, 10), prospects for the immediate future look dreadfully dim. This paper details the changing geography of Africa's refugee crisis. Short- and long-term patterns are shown in light of ever-changing political and environmental factors.

DAMAGE ASSESSMENT OF THE 1988 FLOOD IN BANGLADESH

by Belayet H. Khan, Eastern Illinois University, Charleston, Illinois 61920.

Bangladesh is a deltaic country with a population exceeding 100 millions. The country has an extensive network of river systems which are subject to seasonal flooding mostly due to summer monsoon rainfall. The late summer flood of 1988, one of the most catastrophic flood hazards in the history of the region, has claimed at least 2000 lives and total damage has been estimated to be in hundred of millions of Dollars. Flood water inundated most of the southern half of the country and more than 70% of the population of the Bangladesh was directly affected. Dhaka, capital of the country and located in a considerably higher elevation, was virtually paralyzed during the flood. A questionnaire survey was conducted during the early summer of 1989 in order to assess the damages due to the flood in Dhaka. The main focus of the study was to evaluate the monetary losses of the residents of the city. Analysis of the surveyed data indicates that loss of lives were minimum in the city. Although various sources report extensive flood damages throughout the country, personal losses of the residents of Dhaka was found to be relatively lower in the sample survey.

CHILD NUTRITION AND PUBLIC POLICY OPTIONS: A CASE STUDY OF MEXICAN AMERICAN CHILDREN:

by Chandra C. Khan, and Milton E. Harvey Department of Geography, Kent State University, Kent, Ohio 44242.

The main objective of this paper is to conduct a large scale systematic study of the nutritional status of the Mexican American children (Birth to 11 yrs. of age), using the recently released Hispanic Health And Nutrition Examination Survey (HHANES) 1982-84. The main emphasis is on developing a framework for a child's nutrition system, to evaluate the causal relationships between the child's nutrition status and the Public policy options available to the household. Accordingly, the sub systems of the child's nutrition system are identified, inter systemic linkages articulated and finally hypothesis exploring the linkages between the subsystems are developed and empirically tested. As it presently stands, we are allowing the nutritional priorities of the Mexican American children be set without regard to the existing scientific evidence. It is hoped that the pioneer nature of this paper will provide a basis for nutritional intervention(s) for the Mexican American children in the five southwestern states of the United States, in relation to the pertinant theoretical, planning and policy implications.

THE STATUS OF RURAL WOMEN IN THE SOVIET UNION

by Ksenya Khinchuk, Department of Geography, Boston University, Boston, Mass. 02215.

Utilizing Soviet statistical and social research data, author analyzes the current position of, and problems facing, women in rural areas of the Russian Republic of the Soviet Union. The study covers the following four sets of issues:

1. Demographic conditions: In recent years it was a trend towards a decline in the percentage of females in the agricultural sector as a result of the high levels of outmigration of young women. This trend is producing problems that have important consequences for the future of Soviet agriculture.
2. Family Conditions and Private Life: The declining share of women is creating difficulties in family formation, adding to a number of single people and to the aging of the rural population. Lower standards of living and lack of services also add to the extra burden of women.
3. Occupational and Educational Opportunities: Rural occupational structure provides limited opportunities for women, and for upward mobility, in spite of their educational achievements.
4. Current reforms: The paper outlines the current changes in agricultural organization and their consequences for the status of women.

CONTRASTS IN REGIONAL INDUSTRIAL PRODUCTIVITY CHANGE

by Clayton Kie, Department of Geography, The Ohio State University, Columbus, Ohio, 43210.

Manufacturing labor productivity change is examined in two regions: the Midwest and New England. Significant distinctions in the spatial form and functional source of productivity change are evidenced between these regions for the 1967 to 1977 decade.

Variation in manufacturing productivity growth is assessed as a function of industrial output growth and of capital intensification. An extension of the Verdoorn law establishes a productivity function using certain assumptions to obtain the independent contribution of capital deepening toward productivity change. Consideration is then given to the spatial and functional contexts of this relationship via the use of Casetti's expansion method.

Such contexts are found to have variable impacts upon the productivity effects of output growth and capital intensification. The two regions display notably dissimilar patterns of contextual influence. Generally, distinctions between the regions relate to the relative significance of capital deepening in providing for productivity growth, the spatial form of both output and productivity change, and the divergent role performed by production process disintegration.

SECTORAL AND FUNCTIONAL VARIATIONS OF ECONOMIC BASE MULTIPLIERS

by Hak-Hoon Kim and Gordon F. Mulligan, Department of Geography and Regional Development, The University of Arizona, Tucson, Arizona 85721.

As economic base analysis provides a reliable means to estimate multiplier effects in impact situations of sparsely settled, small communities, many researchers have employed the economic base approach in their studies. In order to examine the sectoral and functional variations of economic base multipliers in small towns, this paper analyzes the Arizona Community Data Set (ACDS) that compiles the employment characteristics and selling behaviors of virtually every establishment in 47 small communities. This study adopts regression models to test the relationship between sectoral nonbasic employment and community total employment as well as the role of public transfer payments, in accordance with the functional types of communities.

The study results indicate that the marginal propensity of each sector to sell locally varies with the functional type of community and that the impact multiplier is highest in manufacturing communities. It is also assured that the transfer payment variable is an important explanator of nonbasic employment since the actual change in nonbasic employment is generally overestimated without the transfer payment variable.

DEFORESTATION IN TROPICAL REGIONS: A STUDY OF REGIONAL VARIATION by Mary Kimsey, Department of Geography, University of Georgia, Athens, Georgia, 30606

Global deforestation is occurring at an alarming rate. As a result, an abundance of literature has appeared that identifies the possible causes of deforestation with the intention of articulating a descriptive or quantitative model of the phenomenon. Considerably less attention has been paid, however, to the possibility of regional variation in the factors influencing deforestation. This study seeks to empirically investigate the factors associated with deforestation and explore how their effects vary regionally.

The analysis is based upon data reported for the period 1976-80 by the Food and Agriculture Organization in conjunction with the United Nations Environmental Program as part of the Tropical Forest Resources Assessment Project. Over sixty countries with tropical closed forest are included in the study. The analysis of the data reveals the importance of external factors, such as foreign trade and foreign debt, when creating the most statitically-significant model that explains deforestation. Using Casetti's Expansion Method, regional variations when regions are defined by political, historical and other means, are

SOIL DEVELOPMENT ON A SEQUENCE OF RAISED BEACHES, TRUELOVE LOWLAND, DEVON ISLAND, N.W.T., CANADA by R.H. King and P.E. Kelly, University of Western Ontario, London, Ontario, Canada.

Static Regosolic Cryosols are forming under conditions of free drainage on the crests of a sequence of raised beaches in Truelove Lowland, an area of unusually high biological diversity on the northeast coast of Devon Island in the Canadian High Arctic. The beaches, ranging in elevation from 1 m to 86 m a.s.l. and varying in age from contemporary to approximately 9,700 years B.P., provide an ideal opportunity to study progressive soil development over time.

Employing a comprehensive random stratified sampling design a total of 288 bulk soil samples from three depth intervals have been collected from 24 different beaches and analysed for total organic carbon, total nitrogen, pH, percent sand, silt and clay, total carbonates, exchangeable cations and extractable Fe and Al. Multivariate statistical analyses, including factor analysis, cluster analysis, discriminant function analysis, regression analysis and analysis of variance, are used to assess the degree to which these soils can be considered to represent a chronosequence.

Soil development on the beaches is strongly influenced by a number of environmental factors, including the presence of continuous permafrost, but it does not significantly reflect the age of the beaches. Instead, in the absence of a progressive plant succession and with the soil carbon cycle in an apparent steady state, pedogenesis on the beaches is essentially controlled by local factors and particularly by lithologic variations in the beach deposits themselves.

THE CHANGING POLITICAL STATUS OF THE AFRICAN MANDATED/TRUST TERRITORIES, 1945-1950 by Eugene Kirchherr, Geography Dept., Western Michigan University, Kalamazoo, Michigan 49008.

In a previous study, the author traced the unusual origins and subsequent obscure status of the mandated territories of Africa from 1918 to 1939. The mandate system, wherein the League of Nations formally assigned external powers to serve as administrators of former German colonies, became dormant in 1940 when the League itself virtually ceased functioning. With the organization of the United Nations Trusteeship Council after World War II, the onetime mandates were designated "Trust Territories," and the administering powers became accountable to the U.N.; yet establishing trusteeships was not intended to perpetuate the mandates system, though elements of the former system were retained. The present paper identifies and analyses critical problems of the mandated territories of Africa at the close of World War II and in the early post-war period: (1) the undefined political standing of the mandates prior to the final dissolution of the League in 1946; (2) the initial resistance by various governments to the reassignment of supervisory functions of their mandates to the U.N.; (3) the assertive role assumed by the Trusteeship Council (compared to the League's Permanent Mandates Commission) in overseeing the governance of trust territories; (4) the refusal of South Africa to transfer its mandated territory to U.N. supervision; (5) the impact of policies supporting self-determination for trusteeships on emerging nationalist movements in neighboring colonies; and (6) the U.N.'s creation of the new (and last) African trust territory of Somalia. By 1951, trusteeships were recognised as special constituents of Africa's political mosaic, but the '50s would prove difficult years of transition before independence of trust territories was finally achieved.

CHARACTERIZATION OF POTENTIAL EVAPOTRANSPIRATION PATTERNS IN ILLINOIS by Scott Kirsch, Memphis State University, Memphis, Tennessee 38152.

Long-term historical data (1949 to 1986) from the NWS cooperative weather observer program, augmented by local climatological data from selected cities were used to generate point values, at the cooperative observer sites in Illinois, of monthly potential evapotranspiration (PET). These point values were calculated utilizing the Blaney-Criddle method, a temperature based approach. These values were then used to generate semivariograms which quantify the variation in PET with distance and direction.

Utilizing the semivariograms and the spatial statistical technique known as kriging, a dense grid of PET estimates were interpolated from the point values of PET, calculated using the Blaney-Criddle method, generated at the instrumented sites. These are the best, linear unbiased estimates of PET at the uninstrumented sites. The estimates were then contoured to graphically illustrate the spatial patterns of PET over time in Illinois. Estimates of this sort have utility in, for example, irrigation scheduling, water resources planning, observer network planning and general hydrolcgic modelling.

HIGH TOUCH/HIGH TECH: MANAGEMENT REVOLUTION IN GIS by Daniel Kjerne, Ph.D. student, Department of Geography, University of Washington DP-10, Seattle, WA 98115, and Kirsty Burt, GIS Manager, City of Bellevue, Box 90012, Bellevue, WA 98009.

Managers responsible for the mapping/geographic information function in local government at present may be said to be living in the "interesting times" of the ancient curse. As always, their organizations compete along with others for budget, resources, and support. At the same time, available technology, capabilities, and mission are all changing rapidly. Amid this tumult, they need to provide enough stability to allow staff to take the risks needed to come up with creative solutions.

Management of such an operation requires an approach that is revolutionary compared to that which is common today. Principles elucidated by Tom Peters and others (*In Search of Excellence; A Passion for Excellence;* and *Thriving on Chaos*), in the course of researching successful private-sector firms, are also applicable in the public sector.

This paper shows how these principles have been applied in one case at the City of Bellevue, Washington, and gives a qualitative assessment of their efficacy in public-sector GIS.

LOW INCOME HOUSING POLICY IN JAMAICA: THE ROLES OF STATE AGENCIES AND U.S.A.I.D. by Thomas Klak, Geography Department, 103 Bricker Hall, Ohio State University, Columbus, OH 43210-1361.

This paper examines the roles of 2 Jamaican parastatal agencies and the U.S. Agency for International Development in housing finance for income levels that are excluded by the private market. The interest is to identify the logic by which each agency operates, in order to gauge that logic's compatibility with, and its ability to fulfill, the principal policy objective of low income shelter assistance. To do this, the paper explores each agency's specific motives and interests, sources of funding and the constraints and opportunities implied, and the logic of operation built into its economic and political structure. The paper documents a variety of financial, economic, and political factors that undermine low income housing assistance, thereby explaining the housing programs' inability to accomplish their own objectives.

PEATLAND FORMATION AND ICE AGES: A POSSIBLE GAIAN MECHANISM RELATED TO COMMUNITY SUCCESSION by Lee F. Klinger, National Center for Atmospheric Research, Boulder, Colorado 80307.

Terrestrial areas, which support over 99% of the earth's biomass, have considerable potential for being involved in biosphere-atmosphere feedback loops as postulated by the Gaia hypothesis. This paper presents a model of a possible Gaian mechanism related to landscape-level successional changes occurring over a glacial-interglacial cycle. The model is based on the view that terrestrial successions converge toward bogs, rather than toward old-growth forest, and that bogs represent structurally and compositionally stable (climax) communities. The model also assumes, as in classical successional theory, that during the course of succession the biota modifies the environment, both the soil and the atmosphere, to favor the progression of succession toward the climax state. Feedback mechanisms between peatlands (landscapes of bogs and bog forests) and the atmosphere are proposed which should promote the initiation and maintenance of relatively stable, ice age climates. These cooling mechanisms are related to increased albedo, increased evapotranspiration, and decreased atmospheric CO_2 associated with the succession from woodlands to peatlands. Ice core and ocean core data for CO_2, CH_4, and ^{13}C and ^{14}C isotopes are consistent with the proposed terrestrial dynamics involving organic carbon cycling.

CROSS-FIELD TERMINOLOGY AND GIS by Brian Klinkenberg, Department of Geography, University of British Columbia, Vancouver, B.C. V6T 1W5 (e-mail: brian@geog.ubc.ca)

In any field, terminology can become a barrier through which initiates must pass. Once in the field, practitioners become accustomed to the nuances of the terminology and, as a result, communication with outsiders may require the use of a translator. This cross-field communication can become especially difficult if similar terms are used in the different disciplines but subtle differences in meaning are not evident.

Communications between remote sensing and GIS specialists, and between the fields of surveying and geography, present two such examples of potential cross-field communication problem areas. In each of these disciplines terms such as error and accuracy are commonly discussed—but do they have identical meanings to the practitioners in each field?

In this presentation a discussion of cross-field terminology will be presented, and the subtle differences in meaning explicitly laid out.

* * *

BORDERLANDS AS "REFUGEELAND" - POLITICAL GEOGRAPHICAL IMPLICATIONS by N. Kliot, Department of Geography, University of Haifa, Haifa 31999, Israel

Borderlands in regions of extensive refugee movements in Central Africa, Central America and South-East Asia are becoming political territories with intensive action. Activity in the borderlands begins with refugees crossing a border as a result of political coups, military actions, war and terrorist attacks in the border region within their country of origin. Crossing the border is facilitated becasue (a) people on both sides are related tribally and linguistically (Examples: Mozambicans crossing to Sudan, Miskito Indians crossing from Nicaragua to Mexico). (b) The boundary is not demarcated nor is crossing hampered by physical barriers or fences.

The borderland is turned into a settlement region by waves of refugees transforming peripheral regions into areas with intensive economic, political and military activity. As a result, refugee camps and villages in border areas are both a source area and a target for raids and bombing on both sides of the border (Pakistan-Afghanistan, Mexico-Nicaragua, Mozambique-Sudan)

INDUSTRIALIZED AGRICULTURE AND LAND USE CONFLICTS by W. Klohn, University of Osnabrueck, FRG.

Since the end of the seventies land use conflicts have shown up between industrialized agriculture and environmental protection in the Dümmer Lake region (FRG). At the beginning of the eighties pastures and meadows were converted into arable land, corn cultivation was extended, and the application of liquid manure on low peat soils was increased. These measures have degraded the ecological value of the region and have caused also an increasing eutrophication of the lake which has more and more silted up. In 1987 the Government of Lower Saxony presented a long-term concept for the environmental protection of the Dümmer region which includes a spatial separation of the different land use requirements. At present there are serious problems in realizing this concept because of lacking substitutional land for the farmers and the unsolved problem of the disposal of the liquid manure surplus which is not, or only in small quantities, allowed to be applied on the land of the planned nature reserve. The solution of this land use conflict and the successful realization of the environmental protection concept at the Dümmer Lake will have a great effect on similar projects in the Federal Republic of Germany.

ANDEAN ANTHROSOLS AND EROSION: MODELLING OUTCOMES OF INTENSIFICATION by Gregory W. Knapp, Department of Geography, University of Texas at Austin, Austin TX 78712.

Fertilizing and cultivation practices have substantial positive and negative impacts on soil and soil potential. Under traditional conditions, as in the Andes, fertilizer availability may be limited, and intensification may lead to exhaustion of the soil resource and chronic yield reduction. Agricultural intensification theory allows for the modelling of the simultaneous utilization of different soil bodies under varying assumptions of production rationality, level of demand, and manure availability. Such a model is constructed for the northern highlands of Ecuador and used to indicate the implications for soil fertility, yield, and carrying capacity of such variables as population density, family access to manure, availability of irrigation, and presence or absence of crop rotation. The model indicates that the same population may simultaneously improve the fertility and carrying capacity of some soil bodies while depleting others. The differential impacts are not however determined by the relative "fragility" of the soil resources but rather are the outcome of a specific adaptive rationality and adaptive context; changing selected components of the adaptive context can dramatically change the nature and extent of adverse soil impacts. The history of Andean land use and production zonation provides supporting evidence for these conclusions.

SPATIAL VARIABILITY IN NATURAL RECOVERY PROCESSES IN THE AMERICAN WEST by Paul A. Knapp, Department of Geography, University of Nevada, Reno, Nevada 89557

Natural soil and vegetation recovery processes following human-related disturbances in the semiarid and arid American West are little understood. The few studies which have examined soil and vegetation recovery rates in these regions have been conducted in the Mojave Desert and western Montana. Results from these studies suggest that soil and vegetation recovery can take several hundred years depending on numerous factors including climate and the severity of disturbance. This study examines natural recovery processes in the Great Basin Desert in an effort to compare the effects of location on soil amelioration and plant revegetation. Repeat photography is used to illustrate vegetation changes that have occurred in southwestern Montana since the height of settlement. These photographs are then compared to historic photographs of disturbed areas in the Great Basin to determine if any distinct recovery processes can be hypothesized.

DIFFERENCES BETWEEN GAY AND NON-GAY NEW ORLEANIANS IN THE PRODUCTION AND CONSUMPTION OF GENTRIFIED HOUSING by Lawrence Knopp, University of Minnesota-Duluth, Duluth, Minnesota 55812, and Mickey Lauria, University of New Orleans, New Orleans, Louisiana 70148.

In this paper we present results of a survey of residents and property owners in a gentrified New Orleans neighborhood. The survey was designed to explore the proposition that gentrification by gay people constitutes a spatial response to oppression. Accordingly, we classified respondents according to sexual orientation and whether or not they could be defined as gentrifiers, and asked questions pertaining to their practices and attitudes regarding the production and consumption of housing.

Responses indicated a complex reality. Differences between gay and non-gay gentrifiers overall were few, indicating that in New Orleans, as elsewhere, gentrification is a process in which class interests predominate. At the same time, both gay and non-gay gentrifiers responded that cultural and lifestyle issues were very important. Gay respondents were particularly inclined to define their reasons for owning and improving property in use-value terms. Moreover, they often identified a link between these cultural and lifestyle issues and the quality of their lives as gay people.

These results suggest that, contrary to many claims about the social characteristics of in-movers, the processes producing a market for gentrified housing favor middle class gays in part *because* of their alternative cultural values and practices.

THE DOWNSTREAM VARIATION IN LEAD AND ZINC IN OVERBANK SEDIMENT by J. C. Knox, 234 Science Hall, University of Wisconsin, Madison, Wisconsin 53706.

The mining of lead and zinc in the Upper Mississippi Valley between the 1820s and the early 1950s produced major inputs of those heavy metals into stream systems. Magnitudes of maximum concentrations of metals adsorbed onto silt and clay particles of overbank floodplain sediment occasionally exceed 15,000 ppm for zinc and 5,000 ppm for lead. The magnitude of the maximum level of concentration tends to decrease downstream from the mining point source at approximately the -0.5 power of distance. The belief that most metals are transported by being absorbed onto silt and clay particles rather than as individual grains of sulfide ore is supported by results comparing extractions by hydrochloric acid vs extractions by nitric acid. (The weaker hydrochloric acid solution is mainly sensitive to adsorbed metals whereas the stronger nitric acid solution also digests sulfide ore particles.) Results indicate that concentration patterns for resulting extractions proved to be highly similar (r = 0.98 for zinc and r = 0.98 for lead) across vertical stratigraphic zones. Metal concentrations often show a moderately strong, but spurious, correlation with medium and fine sand concentrations. The relationship is spurious because these sand fractions are common in mine tailings and therefore tend to be of somewhat greater abundance in overbank sediment downstream of mining sites. Detailed measurements of vertical variations in metal concentrations in overbank floodplain sediment show that lead has remained relatively fixed in stratigraphic position since deposition whereas zinc has a slight tendency to be leached downward in the soil profile.

URBAN CHANGE AND THE ORIGINS OF A DUAL HEALTH CARE DELIVERY SYSTEM by J. Bohland, P. Knox and N. Shumsky Virginia Polytechnic Institute & State University, Blacksburg, VA 24061-0113.

Provision of medical care to the uninsured, working poor has become a major issue in the United States. In this paper we argue that the problem has been persistent in the country since the late 19th century, and that it is a function of the commodification of medical care that emerged in conjunction with the urban/industrial transformation. The paper reports on a study of the changing geographic structure of the health care delivery system in San Francisco between 1870 and 1915 and how those changes influenced access to care by the city's working class. Particular attention is paid to the role of ethnic social institutions and of the dispensary movement in delivering medical care to the working classes. Records from ethnic benevolent societies are used to describe their role in providing medical care and their importance in shaping the structure of the city's health care delivery system. Historic data drawn from patient records for the city's dispensaries are used to analyze these sources of care for the working class. The results support our contention that the origins of dual health care delivery systems, one affordable to the middle-class and another for the working classes, lie in the early transformation of the city and its medical care delivery system.

A MIDWESTERN INDUSTRIAL GEOGRAPHY OF THE FOURTH KONDRATIEFF WAVE. by Daniel C. Knudsen, Department of Geography, Indiana University, Bloomington IN 47405

The most recent wave of capitalist accumulation was led by consumer durables and characterized by mass consumption of standardized products produced under the Fordist regime and supported by a modern welfare state based on Keynesian economics. This period of Pax Americana lasted until the mid-1970s when major changes in the American economy occured. These changes included a collapse of manufacturing growth in the traditional manufacturing heartland of the U.S., breaking of the truce between capital and labor established during the Depression and an end to faith in the welfare state. This paper analyzes the end of the Fourth Wave in the North East Central census division using County Business Pattern data for 1965-85 and Poisson regression techniques. Findings offer some hope for the future of the Midwestern economy, largely validate the theory of long waves and stress the need for technological innovation and a national industrial policy.

INSHORE RESPONSE TO OFFSHORE SEGMENTED BREAKWATERS, PRESQUE ISLE PENINSULA, PENNSYLVANIA by Paul D. Knuth, Edinboro University of Pennsylvania, Edinboro, Pennsylvania 16444

This study seeks to examine the impacts of hard stabilization of a naturally evolving recurved sand spit. The 2000 acre spit is designated as a State Park and has annual visitation in excess of 4,000,000 people annually. Three prototype structures built there ten years ago are examined as a means of determining impacts of planned fifty-eight segment project on the Park's environmental systems.

Aerial photographs are examined as a means of determining shoreline response behind, updrift, and downdrift of the prototype structures. The actual response is compared to the response predicted in model studies. Records of fecal coliform counts are examined to determine the effect of reducing wave energy in the littoral on water quality and public health. The loss of palustrine sand flats as a result of downdrift erosion is examined to determine the impacts on rare and unique plant species in a critically sensitive ecosystem adjacent to the prototype structures.

The results of the study indicate that model studies are unable to accurately predict the resultant shoreform. Tests for fecal coliform show that levels of contamination shoreward of the breakwaters is likely to increase because of reduced dispersion. The prototype breakwaters have altered prime and unique habitat for a variety of rare species. The most obvious conclusion to be drawn is that additional study is needed to assess the risks involved with the use of this type of hard stabilization.

RESTRUCTURED REGIONS AND FAMILIES: POVERTY FEMINIZATION IN THE U.S. by Janet E. Kodras, Florida State University, Tallahassee, Fl 32306 and John Paul Jones, III, University of Kentucky, Lexington, KY 40506.

This study examines the geographic dimensions of the feminization of poverty in the U.S. from 1970 to 1980. County level maps of growth in female-headed poverty show strongest concentration in the Northeast and North Central regions. Three explanations for these variations are presented: the breakdown of the traditional nuclear family, changes in welfare programs, and the status of women's work. The last of these is integrated into a broader thesis focusing on sectoral and spatial economic restructuring. Dynamic regression models of growth in black and white female-headed family poverty are estimated using county level data, for the entire U.S. and stratified by census region. The results confirm the importance of female-headed family formation across all region and race subfiles. Welfare program changes operate at the national level, but not in accordance with expectations derived from the conservative perspective. The regional restructuring thesis is also supported: concentration of women's employment in manufacturing is associated with declining poverty in Northeastern and North Central counties, while growth in service occupations is found to increase poverty in the South and West.

INTERREGIONAL MIGRATION AND SPATIAL INTERACTION MODELS by Sotiria Koloutsou-Vakakis, Department of Geography, University of California Los Angeles, CA 90024.

The study of spatial interaction continues to be dominated by gravity models and in this paper two forms of the doubly constrained model, the multiplicative form (Wilson) and its corresponding additive form (Tobler), are examined with reference to interregional migration in Netherlands. The study examines two time periods and two spatial resolutions. The study suggests that emphasis on gravity type models is not paralleled with empirical results.

The models however, do present a significant descriptive potential which deserves more attention before more elaborate predicting model forms are explored. This descriptive potential is neatly exploited with the cartographic interpretation of the additive model form, as presented by Tobler. The flow maps are a valuable tool for the exploration and understanding of large migration tables. Implementation of the flow maps within a wider GIS seems to be a promising avenue for the unravelling of the causes of migration and the building of an efficient theory of migration. Within this context, the expansion method, as a means of facilitating the conceptual process, may be employed.

GENDER DIFFERENCES IN U.S. MOBILITY - 1975 TO 1985 by Tara A. Kominiak, University of California, Los Angeles, California 90024

In studies of several Western industrialized nations, male and female mobility rates have shown a trend of convergence over the past several decades. However, the recent U.S. study by Stapleton showed an apparent divergence in rates over the decade of the 1970s, raising the question of whether this was a temporary fluctuation or a longer term trend of significance.

In this analysis, data from the American Housing Survey were used to trace the trend in gender differentials between male and female household heads for the period 1975 to 1985. Rate changes were decomposed using the Das Gupta method into changes resulting from age and marital shifts in the population and those resulting from "real" rate changes. The crude differential showed some yearly fluctuation, but overall, the ratio of female to male rates fell from .93 to .90. When compositional shifts were controlled through rate decomposition, the differential increased between 1975 and 1979, concurring with Stapleton's findings. However, it narrowed over the following years, showing a very minor overall decrease for the ten year period. The differential was relatively persistent for the duration of the study and the sample population showed little evidence of significant rate convergence. Females were less mobile than males in all years, and significant gender differences were noted for both age and marital status.

THE ROLE OF A NEIGHBOURHOOD ORGANIZATION IN THE TRANSFORMATION OF AN INNER CITY SKID ROAD NEIGHBOURHOOD by D. Konrad, Department of Geography, University of British Columbia, Vancouver, B.C. V6T 1W5, and K. Olds, Centre for Human Settlements, University of British Columbia, Vancouver, B.C. V6T 1W5.

Inner city neighbourhoods in many cities have been undergoing a dramatic social and physical restructuring in recent years, with many aging communities vulnerable to redevelopment pressures. Neighbourhood organizations can be seen as mediating institutions to enhance sensitive place-making in the transformation of inner city neighbourhoods. Working class neighbourhoods with strong representation can negotiate the implementation of the restructuring process, thereby acting to temper the implications of systemic change being worked out in the urban form.

A case study approach is utilized to examine the role of a residents' association in mediating the transformation of the skid road neighbourhood in Vancouver, B.C. from 1973 to the present. Current theoretical debates on uneven development, urban social movements and hegemony can inform an understanding of the role played by the neighbourhood organization in the reworking of the Vancouver inner city neighbourhood.

The neighbourhood organization has effected substantial changes in the built environment with the attainment of social housing units, increased community amenities, and political recognition. However, the improvements threaten to encourage social upgrading.

BORDERLANDS: A CONCEPT FOR REINTERPRETING NORTH AMERICA by Victor A. Konrad, University of Maine, Orono, Maine 04469

The premise of the borderlands concept is that North America runs more naturally north and south than east and west as specified by national boundaries, and that commonalities tend to blur distinctions between regional neighbors. While people living near the border continue to pay allegiance to their respective sovereign authorities in Washington D.C and Ottawa, they may have more in common with neighbors across the border than with their fellow citizens across the country.

The Borderlands thesis is part of a new paradigm for interpreting North American integration. North America is conceptualized as a unique continental amalgam where culture remains decidedly plural; political lines are incised yet social forces move people across boundaries within a vast and relatively underpopulated land mass. This concept of North America defines a continent that is more complex and vigorous, and consequently more effectively integrated than the simple layering of Canada beyond the United States and Mexico below it. The paper seeks to establish the key integrative elements that were set in place as the three countries, and particularly Canada and the United States, emerged as independent yet interdependent states. Because the countries show significantly distinct national developments, the formation of the integrative elements is veiled and it is most evident in the borderlands.

EMPLOYMENT DECONCENTRATION AND COUNTER-URBANIZATION IN THE FEDERAL REPUBLIC OF GERMANY by Thomas Kontuly, University of Utah, Department of Geography, Salt Lake City, UT 84112.

During the 1970s major developments started taking place in the geography of population in the U. S., Western Europe, Canada, Australia, and Japan. These changes, labeled "counter-urbanization" in Europe and the "rural renaissance" in the U. S., generated intellectual excitement about the possibility of a fundamental change in the patterns of spatial population distribution, a change which many researchers believed reflected the shift from an industrial to a post-industrial society.

Trends evident during the 1980s dampened this excitement somewhat as counter-urbanization slowed or even reversed in several countries. At present, patterns are much more complex and varied than those observed during the 1970s, with the U.S., U.K., and northern Europe showing renewed urbanization and continental Europe showing continued counter-urbanization.

This paper focuses on one country in continental Europe, the Federal Republic of Germany (FRG), and attempts to provide an explanation for why trends remain in a counter-urbanization direction. Patterns of population change in the FRG appear to correspond with the principles of deconcentration theory, in that a spatial deconcentration of employment during the 1960s, 1970s, and 1980s allowed working aged migrants to actualize their preferences for living in lower density and small sized urban areas and as a result a regional deconcentration of population occurred during the 1980s. Deconcentration theory argues that the counterurbanization patterns evident in developed countries represent a long-term shift toward a more spatially diffuse urbanization pattern.

THE IDEA OF COMMUNITY AS HOME IN THE AEGEAN by T. Koop, University of Minnesota-Twin Cities, Minneapolis, MN 55455

The purpose of this paper is to explore the actual and theoretical contribution of the ideal of community to the concept of home in the villages of the Aegean islands of Greece. Attachment to home as a social milieu in this region depends on casual, ordinary interaction that stays at the superficial and utilitarian level rather than stem from the shared search for truth through communal inquiry. Nevertheless, intensive interviewing has revealed a strong sense of social cohesiveness in two villages.

The last two decades have witnessed the inundation into this part of Greece of tourism accompanied by an unprecedented degree of modernization. These currents of change are undoubtedly in the process of disrupting the traditional contexts of association on the Aegean islands. Despite the common tendency to romanticize them, such traditional forms of social unity have never become truly communal, because they have never recognized the essential individuality of all community members. In fact, the ongoing transformation of the Aegean society may eventually introduce forms of social cohesion that better approximate the "ideal community." Constant contact with outsiders seems to be inspiring a new form of rootedness in the village home, a rootedness that puts one's life into a global and temporal perspective and intensifies one's awareness of the local community as home.

SOLID WASTE MANAGEMENT IN A RURAL DEVELOPMENT REGION OF PENNSYLVANIA by Philip D. Koos, Jr., Executive Director, Northern Tier Regional Planning and Development Commission, 507 Main Street, Towanda, Pennsylvania 18848.

The Northern Tie Regional Planning and Development Commission (NTRPDC), is a five-county district in northern Pennsylvania. Among its other functions, the NTRPDC works with county governments to assist in planning. It also has a good perspective on what works regionally and what does not. The purpose of this paper is to explore the evolution of solid waste management planning in this Region. It examines the infrastructure and politics that have influenced the segmented strategies in five counties. It also examines the Pennsylvania State law that governs the role of recycling in communities and regions.

In general, politics, environmental problems, private sector involvement, public participation and state law have resulted in the evolution from regional authorities to separate county plans. These have serious implications for regional efficiencies.

PROBLEMS OF THE ARAL REGION AS A ZONE OF ECOLOGICAL CRISIS by Vladimir M. Kotlyakov, Institute of Geography, USSR Academy of Sciences.

An erroneous strategy in the development of irrigated agriculture in the Aral Sea basin has led to the shrinkage of the Sea, increased salinity of its water, the salinization of the Amu Darya and Syr Darya deltas, degradation of all natural environmental components in a large area, and aggravation of socio-economic problems in the Aral Sea region. The report contains the following: an analysis of reasons for the situation described above, discussion of the productive forces of development in the region, an introduction of the concept of regions in ecological crisis and ecological disaster, and formulation of some tasks for geography in contributing to the solution of anthropogenic desertification.

QUAIL HUNTING AS AN ALTERNATE RURAL LAND USE IN SOUTH CARO. by Charles F. Kovacik and Roy S. Stine, University of South Carolina, Columbia, South Carolina 29208.

The commercial use of land for hunting is just one of many alternate choices available to landowners as they attempt to adjust to lower profits from conventional agricultural practices. This paper traces the evolution of quail hunting in South Carolina as an alternate use of rural land from its beginnings as an exclusive private recreational activity for a wealthy few to an off season state-licensed income source for agriculturalists. It also describes present-day land use methods designed to improve quail habitat. The organized use of land for quail hunting is not a recent phenomenon in South Carolina, and its roots stem, at least, to the 1870s. Similar to recent developments, this early activity also was stimulated by the declining profitably of traditional agricultural practices. In addition to planting cover and feed crops, a major land management technique is to reduce field size and maximize the transition zone between field and forest. Public and private shooting preserves cluster in the state's most productive agricultural areas.

CONSTRUCTION OF BELTLINE ROUTES: IMPACTS ON RURAL COMMUNITIES
by Rita M. Kozak, Plant and Earth Sciences,
University of Wisconsin-River Falls, River Falls, WI 54022

As rural communities grow and change from primarily an agricultural base to a more diverse, service-oriented base, the traffic pattern and flow through downtown areas is seen as a dilemma--does traffic on the main street increase or decrease business and shopping opportunities? Increased traffic in downtown areas (particularly in communities that are divided by state highways) has been seen as detrimental and has been solved by the construction of a beltline (or by-pass) route. Case studies of several Wisconsin communities indicate that beltline construction is a controversial solution to traffic congestion.

Conclusions suggest that public participation in the beltline decision process lessens the negative impact on businesses, that zoning must be implemented prior to construction and that certain control mechanisms exist to control land use in and around the beltline route.

LONG WAVE SPATIAL AND ECONOMIC INTERRELATIONSHIPS IN URBAN DEVELOPMENT by S. Krakover, Ben-Gurion University of the Negev, Beer Sheva, 84105 Israel and R.L. Morrill, University of Washington, Seattle, Washington 98105.

The objective of this study is to investigate the interrelationships between long wave economic cycles and spatial trends occurring in the urban-regional scale along the time span of the last one hundred years.

The period between 1890 and 1980 is roughly divided into two Kondratieff long wave cycles: the 3rd Kondratieff between 1890 and 1940 and the 4th from 1940 to 1980. It is hypothesized that i) the 3rd Kondratieff coincides with spatial trends of urban centralization while the 4th conforms spatial trends of decentralization; and ii) during both cycles, periods of greater prosperity are characterized by inner counties growth and outer counties decline while periods of recession tend to exhibit opposite trends.

Decennial population growth data was utilized for three metro-regional urban centers: Philadelphia, Chicago, and Atlanta, using counties as research units. Structures of spatial-temporal population growth were constructed independently for each Kondratieff and for each urban region. These structures were obtained by relating population growth to polynomials of 4th degree in distance expanded by 2nd degree in time.

The results, with R^2s ranging between .19 and .60, seem to generally approve our hypotheses. Major incongruence is found with respect to Atlanta wherein decentralization started later in the 4th Kondratieff. Disconformities may be related to the age of the city or to differential timing of national versus regional business cycles.

U.S. REFUGEE POLICIES AND MIGRATION SINCE WORLD WAR II
by E.P. Kraly, Department of Geography, Colgate University
Hamilton, New York 13346

In the 45 years since the end of World War II the United States has admitted no fewer than two million refugees for resettlement. Both pace and geographic origins of refugee admissions have varied during this period. The political origins of refugees, however, have assumed some constancy. Since the mid-1950s the vast majority of refugees to the United States have emigrated from Communist dominated states. Nor has the ratio of Communist to non-Communist countries of origin varied greatly in the years since the passage of the Refugee Act of 1980. This paper sets forth both the bounds and structure of refugee policy and its fitful development since the end of the war and documents the number and national composition of the populations admitted. Refugee migration is also related to trends and patterns of legal immigration to the United States.

NARRAGANSETT BAY, RI: THE URBANIZATION OF AN UPPER ESTUARY by Gerald H. Krausse, Department of Marine Affairs, University of Rhode Island, Kingston, Rhode Island 02881.

The objective of this paper is to trace the development evolution of the Providence River and adjacent port areas of the upper Narragansett Bay in Rhode Island. First, specific periods in land use change and development are identified using the concept of sequent occupancy. The shoreline continued to change as a result of intensified economic activities and associated land reclamation. The sector model (Hoyt) and the concentric zone model (Burgess) are used to develop a general land use model for the inner-city and shore environment of Providence. The results clearly indicate a spatial shift in development dynamics from the head to the mouth of the river. The immediate hinterland gradually opened up as a result of improved roads and railroad systems radiating away from the river.

ROUTE 66: MAPPING AN AMERICAN HIGHWAY

by Arthur Krim, Salve Regina College, Newport RI 02840.

Route 66 was the primary highway linking Chicago with Los Angeles during the early auto age of the 20th century. Designated as a U.S.highway in 1926, Route 66 served as the main migration path from the Midwest to California in the decade of Dust Bowl drought. Mapping sequences for early Route 66 show the value of period oil company maps and auto club surveys as the primary cartography of highway location. Symbolic mapping of Route 66 is dated to Phillips Petroleum Company and chapter settings by Steinbeck in The Grapes of Wrath. Postwar projections are keyed to the song-map hit by Troup and Cole, "Get Your Kicks on Route 66!" and the CBS television series Route 66. Historic mapping of Route 66 dates to declassification of the highway in 1985. Reconstructive surveys reveal a river model of Route 66 with former loops and meanders now overlayed by modern Interstate locations. At present, Route 66 has emerged as the symbolic highway of the American auto age in which cartography of location is replaced by an inconography of memory mapping in song and in visual description.

REGIONAL DIFFERENCES IN THE EXTERNALIZATION OF PRODUCER-SERVICES

by Andrew Krmenec and Adrian Esparza, Department of Geography and Center for Governmental Studies, Northern Illinois University, De Kalb, Illinois 60115.

Growth of the producer-services sector in the U.S. is often attributed to the export potential of services, and lagging productivity of the services sector. In this paper we argue that services growth is explained in part by the externalization of producer-services from the manufacturing sector. We hypothesize that regionally distinct patterns of manufacturing give rise to region-specific externalization. The extent of region-specific externalization is estimated using an economic base framework. Analysis is based upon state and industry-specific occupational employment data across the 1974-1986 period.

THE PIETERMARITZBURG VOORTREKKER BURIAL PLACE : AN APPRAISAL

by D.P.Kruger, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, Louisiana 70803

In South Africa today, the Great Trek (1834 - 1854) is regarded by right-wing politicians, in particular the Conservative Party and the Afrikaaner Resistance Movement, as the symbol of Afrikaaner nationalism. This migration into the interior of southern Africa coupled with the construction of the Voortrekker Monument to commemorate it, are revered as symbols of Afrikaaner unity, freedom, and sovereignty. The primary objective of this paper is to refute the myth of a unified Afrikaaner people from antiquity. An extant Voortrekker cemetery in Pietermaritzburg, Natal, the settlement site of one of the two major branches of the Great Trek was studied. Other primary materials utilized include, land records and names of settlers recorded by the Natalse Volksraad, the governing body of the newly established Voortrekker Republic, Natalia. These observations were placed in the context of historical events, both at the time of the Trek to the present.

The ethos of the Conservative Party today is one of, both racial and linguistic segregation to maintain and strengthen Afrikaanerdom, which they believe germinated during the Trek and has continued to flourish. Conclusions drawn from this study are however contrary to the perception of, (1) Afrikaaner unity from antiquity, (2) the absolute separation of Anglo and Boer cultures in terms of social interaction, and (3) the development of a purely Afrikaaner nation of Dutch descent. This relic landscape reflects the melting of diverse European stocks (Dutch, British, and German) into a young, white South African nation.

CHINA'S COAL TRANSPORT BOTTLENECK: PROBLEMS AND SOLUTIONS,

by Michael Kuby, Arizona State University, Tempe, AZ 85282.

Transport bottlenecks and the associated coal shortage are two of the major constraints on the Chinese economy. Coal accounts for about 75% of primary energy consumption in China, higher than any major country. However, it is inadequate transport capacity rather than production capacity that is causing shortages of coal where it is needed. The World Bank is currently involved in a study to identify the optimal locations and types of transport infrastructure investments to alleviate these shortages. Possible solutions, however, are not limited to more railways, ports, and waterways, but also include minemouth power plants and transmission lines, storage, imports and exports, coal processing (washing, screening, briquetting, gasification), various conservation measures, shifts in coal production regions, shifts in coal types, and relocation of coal using industries. Complicating this situation are environmental concerns about coal use, particularly the fact that China claims three of the five cities with the highest airborne particulate levels in the world.

ENERGY FORECASTING AND THE ENVIRONMENT

by Richard G. Kuhn University of Guelph, Guelph Ontario, N1G 2W1

The use of energy forecasting techniques is fundamental to the formulation of energy policy in Canada and most other countries. Traditionally, forecasts have been based on the extrapolation of past trends. With the rise of computer technology, forecasters are able to devise increasingly sophisticated techniques in attempts to predict basic supply and demand patterns. Although the number of variables considered in computer forecasting models has increased dramatically, environmental factors have rarely been considered in any explicit manner. The inclusion of environmental constraints in the formulation of energy policy, however, is taking on a new urgency, particularly as the consequences of fossil fuel combustion become better known.

The objectives of this paper are threefold: 1) to review briefly contemporary energy forecasting in Canada; 2) to review alternative approaches to future energy alternatives; and 3) to demonstrate the feasibility of scenario analysis as a means of bridging the energy-environment dichotomy.

THE VISUALIZATION OF SPATIAL RELATIONS

Werner Kuhn, National Center for Geographic Information and Analysis, University of Maine, Orono ME 04469.

Geographic Information Systems (GIS) contain models of geographic space. Spatial relations are an important aspect of such models, describing objects and their arrangement in space geometrically. Users of a GIS need to be able to define, query and modify these spatial relations interactively. For example, they want to enter surveying measurements, query the system about particular geometric properties, or specify some geometric constraints.

Interaction languages for these tasks are significantly easier to learn and use, if they express spatial relations graphically. Users can infer some spatial relations from graphical displays of geographic models, e.g. from screen or paper maps. With the aid of an interactive query language, they can also ask queries on specific relations. However, the interactive definition and modification of spatial relations is hampered by the difficulty to visualize the spatial relations *themselves*, not just their effect on the spatial arrangement of objects: How should distances, angles, areas etc. be represented, so that users can manipulate them *as relations*?

The presentation will address this question by showing how the forms of abstraction which have been identified in conceptual modeling (classification, generalization, aggregation, and association) can be used to structure spatial relations and to support their visual representation. Particularly, the classification of spatial relations into a small number of elementary types, the use of functions to generalize relations, and the visualization of function terms will be discussed.

"GIVE ME HALF A PAGE ON....." WRITING AS A MEANS NOT AN END IN HUMAN GEOGRAPHY COURSES

by Richard S. Kujawa, University of Iowa, Iowa City, IA 52242 and University of Maine @ Farmington, Farmington, Maine 04938.

Writing for assignments and examinations is commonplace in college geography curricula. Writing in classroom situations is less prevalent, however. In this paper, I report on an ongoing effort to explore the use of writing as a means for learning and not simply as one component of a testing strategy.

The purpose of the paper is to demonstrate that writing can lead to enhanced levels of student participation and increased involvement in the direction of class discussion. Writing, and reading the product aloud, are argued to be ways to explore student perceptions and ideas before, during and after lectures or discussions take place. I will present a variety of examples from undergraduate courses and discuss student reactions to the process.

A case will be made that writing can be one component of a teaching strategy that recognizes that knowledge is a contested terrain and that "forcing" students to be involved can be a productive and stimulating enterprise.

THE ELUSIVE POPULATION CENTROID OF CANADA by Mark P. Kumler, Department of Geography and National Center for Geographic Information and Analysis, University of California, Santa Barbara, California, 93106.

The center point of an area or population is an interesting concept and is often used in geographical studies. There are, however, several ways to determine a "center point" and at least as many ways to describe them. For very large areas the problem is complicated by the spherical shape of the earth.

In this paper several central points are defined and discussed, including the mean and median centers and the point of minimum aggregate travel. To illustrate the differences between the measures the centers are calculated and presented for the population of Canada. The movement of these centers through time is tracked, and the effect of aggregation to larger areal units is described.

A STATISTICAL ANALYSIS OF FOREST COVER IN THE POST-WAR PHILIPPINES by David M. Kummer, Dept. of Geography, Boston University, Boston, MA 02215 (617) 375-2525.

Cross sectional analysis, using multiple regression techniques, of provincial level forest cover was conducted for 1957 (N=52), 1970 (N=72) and 1980 (N=72). The dependent variables were absolute and percentage forest cover and the independent variables, for which data could be found, included: provincial area, arable land, total population, urban population, upland population, total agricultural area, rice and corn area, rice and corn production, number of farms, irrigation service area, road networks, logging, number and size of concessions and distance from Manila. In addition, a panel analysis from 1970 to 1980 was conducted using the change in forest cover as the dependent variable. In general, the results demonstrate a statistically significant relationship between forest cover and road networks, agricultural area and several demographic variables.

A CASE STUDY OF LAKE EUTROPHICATION OF DIANSHAN LAKE, SHANGHAI, CHINA by Hsiang-te Kung and Long-gen Ying, Department of Geography and Planning, Memphis State University, Memphis, Tennessee 38152.

This paper is intended to: (A) understand the eutrophication process; (B) model phosphorus - limited phytoplankton growth; (C) predict the outcome of species competition; and (D) understand the regenerative mechanisms that resupply orthophosphate to algae. The emphasis of the research on phosphorus in Dianshan Lake is to use phosphorus budget models to predict future changes in trophic state.

Based on the data collected and analyzed of the amount of measured concentrations of total nitrogen, total phosphorus, and calculated indices of secchi disk depth, chlorophyll-a, and total spring phosphorus at Dianshan Lake, Shanghai, China for a twelve-month period from December 1984 to November 1985, Dianshan Lake showed that it was progressively approaching an eutrophication stage. The limiting nutrient in phosphorus, which controls the eutrophication process in the lake. In addition, several empirical models were conducted to predict the critical phosphorus loading of the lake and to calculate the average concentrations of eutrophication indices.

Although Dianshan Lake is in the eutrophication stage based on its measured data, there is no severe deterioration of water quality because of its self-purification mechanism - short hydraulic residence time, shallow water depth, and active human economic activities.

SUCCESSIONAL PROCESSES IN A NATURALLY OCCURRING FOREST EDGE by John A. Kupfer, The University of Iowa, Iowa City, Iowa 52242.

Forest edges exhibit biotic and abiotic characteristics distinct from both the forest interior and the adjacent non-forested areas. Research has typically been limited to an examination of human created edges such as those bordering agricultural fields and urban areas while relatively little effort has been put into the study of naturally occurring edges such as those found along stream channels. Unlike agricultural edges, these riparian edges are maintained largely through natural processes such as cut bank erosion.

In this study, I collected density and basal area data for tree species from 25 sites in three different riparian floodplain microhabitats along the Cedar River in Iowa: forest-agriculatural edges, forest-river cut bank edges and forest interiors. I analyzed these data to quantify the differences in tree community composition and structure and compared the results to projections of a FORET-line ecological model. Functions of light regime, soil type, soil moisture and accessibility to propagules were varied in the model in order to assess the applicability of the concepts of succession and retrogression.

THE NATIONAL HOCKEY LEAGUE - A GEOGRAPHICAL CASE STUDY OF PLAYER PERSONNEL DEMOGRAPHICS by Elwood Kurath and Robert Farrett, Eastern Michigan University, Ypsilanti, Michigan 48197.

The National Hockey League, since its inception in 1917, has been the premier hockey league in the world. Until the mid-1960's, virtually all NHL players were born in Canada, including those playing for U.S. teams. In the last 25 years, as the numbers of franchises has increased, the demographics of player origins have been changing dramatically. The purpose of this paper is to examine the changes by country and the player production shifts within the U.S. and Canada.

The birthplaces of all players on the official NHL pre-season rosters were surveyed. Three year intervals were used, starting with the 1964-65 and ending with the 1988-89 season. Players were listed by country, and Canadian and U.S. players were separated by province or state. Player ratios by province and state were calculated using current populations.

Canadian-born players have dropped from 97% to 76% between 1964 and 1988, while the number of U.S.-born players has increased from 2% to nearly 17% in the same period. Players born outside North America now account for over 7% of the total. The player ratios also show marked shifts in player production areas inside the U.S. and Canada.

SITE ASSESSMENT UNDER THE SUPERFUND PROGRAM: A CASE STUDY by Paul La Courreye, United States Environmental Protection Agency, San Francisco, California, 94110.

The U.S. EPA's Superfund Program uses the Hazard Ranking System (HRS) to evaluate sites to determine if they pose a significant threat to human health and the environment. Sites so designated are placed on EPA's National Priorities List of Hazardous Waste Sites, and these are eligible for federal funds for cleanup.

The Del Amo site in Torrance, Los Angeles County, California is a particularly interesting example of a Superfund site assessment. It is located in a highly industrialized area where the underlying drinking water aquifer was believed to be safe from contamination because of its depth and the presence of aquitards.

During field work, the EPA documented a release of hazardous materials to groundwater in the shallow aquifer underlying Del Amo. No protective aquiclude was found between this aquifer and the underlying drinking water aquifer. Because of the threat to drinking water, Del Amo will score high enough on the Hazard Ranking System to be proposed for EPA's National Priorities List.

The EPA and California's Department of Health Services have now targeted nearby facilities for high priority investigations in an attempt to preserve the integrity of the drinking water aquifer in this semiarid area.

PARTICULATE AIR POLLUTION PATTERNS OVER METROPOLITAN LOS ANGELES by Steve LaDochy, California State University, Los Angeles, California 90032.

Los Angeles is well known for its high levels of photochemical smog and its attempts to attain EPA ozone standards. It is also known for the brownish haze that covers the L.A. Basin on most summer days. However, the decreased visibility over Los Angeles is also due to the high concentrations of particulates suspended in the air. This study examines the spatial and temporal aspects of both TSP (total suspended particulates) and PM$_{10}$ (fine particulate matter with aerodynamic diameter of 10 microns or less) over the L.A. Basin and some of the factors responsible for their buildup. TSP and PM$_{10}$ data for 1984-1988 are analyzed for several metropolitan L.A. locations, along with meteorological data for the same period. Topography and meteorological variables play major roles in particulate variability. The sea breeze, surrounding mountain terrain and strong low inversions lead to highest average concentrations of both TSP and PM$_{10}$ during summer months, particularly in the inland Riverside-San Bernardino areas, the fastest growing areas in California. Traffic patterns also contribute as weekend particulate values are significantly less than on weekdays. Regression equation's are derived to show the relationships between particulate levels and meteorological parameters. Precipitation proves to be an effective scavenger of particles. Hence, drought periods had markedly higher values than at other times, though not for all locations. Photochemical aerosoles add a significant load to primary particulate matter during the summer, especially in the inland regions of the Basin. Surprisingly, TSP and PM$_{10}$ (which makes up a large percentage of the total particuates) are poorly correlated for some locations. Some of the problems with TSP and PM$_{10}$ samplers are also discussed.

LANDSCAPE ASSESSMENT AND MODELING USING DIGITAL TERRAIN ANALYSIS

by Anthony R. Ladson and Ian D. Moore, Department of Agricultural Engineering, University of Minnesota, St. Paul, MN 55108, and John P. Wilson, Department of Earth Sciences, Montana State University, Bozeman, MT 59717.

The hydrologic processes occurring in the landscape are a manifestation of its topographic attributes. Spatially variable topographic-based attributes permit the distribution of hydrologic and nonpoint source pollution processes and vegetation to be mapped within catchments. Several hydrological, erosional, and nonpoint source pollution processes active in the landscape are shown to be physically related to a variety of topographically-based indices. The indices include local slope, β, wetness index, $\omega=\ln(A_s/\tan\beta)$, erodibility index, RKLS/T, stream power index, $\zeta=A_s\tan\beta$, and radiation ratio, H/H_h. The relationships between topographic indices and the spatial distribution of the potential for surface runoff, groundwater recharge, soil erosion, evapotranspiration, and vegetation species distribution are graphically illustrated. These indices are easily computed from Digital Elevation Models, DEMs, using a variety of Terrain Analysis Methods, TAMs, of which local-point methods are the simplest and easiest to use. The United States Geological Survey is currently developing 30 m square grid DEMs for selected parts of the United States. When DEMs become widely available, the methods of landscape analysis described here can be used to assess landscapes and classify them and areas within them for degradation by erosion and other forms of nonpoint source pollution.

THE PRODUCTION OF KNOWLEDGE

by Melinda Laituri, Department of Geography and Regional Development, and Udall Center for Studies in Public Policy, University of Arizona, Tucson, AZ 85721.

Innovations such as biotechnology have created unexpected relationships within the university. Changes in the realm of knowledge have been initiated by the coupling of biotechnology and economic development, while disciplines are being reshaped to accommodate a restructuring of science and a redefinition of nature.

This paper explores the various implications of technological innovation emerging within and from the university. These include: the ways in which the latter has changed to accommodate the marketing of ideas and products; the likely impacts of biotechnology on various disciplines; the effect of biotechnology upon definitions and understanding of nature, and the impact of economic development upon the role of the university itself as a producer of knowledge.

PALEOWINDS OF THE MOJAVE DESERT DETERMINED FROM VENTIFACTS AND AEOLIAN SEDIMENTS

by J. Laity, California State University, Northridge, CA 91330 and V. Tchakerian, Texas A & M University, College Station, TX 77843.

Ventifact groove trends in the east-central Mojave Desert are mapped to determine past wind flow patterns and climate. Groove alignments are then compared with the present-day wind regime. The aeolian history is assessed by assigning numerical and relative ages to the ventifacts by examining surface micromorphology and by dating rock varnish, which forms on the surface following cessation of abrasion.

Ventifact groove trends fall into three clusters: westerly, northerly, and southerly. Exact orientations reflect micro- and macrotopographic effects. The north and south trending grooves appear to have been abraded in a major pulse of erosion that ceased around 5100 to 6700 years ago. West trending grooves are no older than 300 years, and are probably active at present. Thus, it appears that an early Holocene north-south monsoonal flow has been supplanted by westerly flow at present.

Scanning electron microscope data from aeolian sediments, based on mechanical and chemical weathering parameters, suggests that aeolian deposition was episodic during the Holocene, but peaked between 8 and 5 ka.

Unravelling the complex aeolian history of the region involves an understanding of the factors that affect ventifact formation and aeolian sedimentation, discovery and detailed mapping of ventifact sites, and large numbers of dates to provide a statistically reliable population. A thorough mapping and dating of ventifacts and determination of aeolian stratigraphy provides a unique regional record of paleocirculation

LEGITIMATION CONFLICTS: THE POLITICS OF HAZARDOUS WASTE SITING LAW

by Robert W. Lake and Rebecca A. Johns, Rutgers University, New Brunswick, NJ 08903.

Hazardous waste siting law reflects an intensely political struggle. This analysis attempts to go beyond commonplace "NIMBY" explanations of local opposition to understand the structural sources of political conflict over hazardous waste facility siting. This struggle is rooted in a fundamental conflict between local and higher tiers of the state in the sources and nature of state legitimation. The local state relies on *contextual legitimation* derived from popular recognition of its local efficacy. Higher tiers of the state rely on *formal legitimation* derived from popular recognition of their authority. The need for contextual legitimation causes the local state to act with respect to local contingencies. The need for formal legitimation causes higher tiers of the state to act with respect to abstract authoritative principles. These legitimation claims and consequent state actions are in conflict. Local state action in response to local contingencies undermines the formal legitimation of higher tiers, while action based on abstract formal principles undermines the contextual legitimation of the local state. An intense political struggle ensues between tiers of the state seeking to secure mutually exclusive dimensions of legitimation. Laws governing hazardous waste facility siting represent the outcome of that political struggle. Regional variations in the structure and implementation of siting law reflect local contingencies in political outcomes. We illustrate this conflict with a set of cases representing different outcomes in the structuring and implementation of hazardous waste siting law.

WATER CONTROL AND THE DEVELOPMENT OF AGRICULTURE ON GUYANA'S COASTLAND

by V.C. Lakhan, Department of Geography, University of Windsor, Windsor, Ontario, N9B 3P4

Efficient water control is the prime requisite for the development of agriculture on Guyana's coastland which has more than one million cultivable hectares. The implementation and utilization of water control facilities such as sea defences, canals, sluices, dykes, dams and drainage and irrigation schemes have facilitated the expansion of coastal agriculture, and entrenched agriculture as a major source of production and foreign exchange earner for Guyana.

Analysis of government expenditures demonstrate that between 1954 and 1964 more than one-third of the total budget was spent on agriculture, with the bulk of the money used for the development of drainage and irrigation schemes (for example, Boerasirie, Black Bush Polder, Tapakuma and Mahaica/Mahaicony Abary). An increase in cultivated acreage made possible by the drainage and irrigation projects resulted in a doubling of rice production, and a forty-four percent increase in sugar production for the 1955-1964 period. Yields and outputs of several other agricultural commodities also increased, and in 1963 agriculture contributed nearly thirty-three percent of Gross Domestic Product (GDP).

Since 1966, reductions in capital investments for the maintenance of drainage and irrigation projects, and other water control infrastructure have resulted in not only declining yields and production from the agricultural sector, but also reduced GDP and foreign exchange earnings. Improvements to the agricultural sector can be attained with planning for water control which not only requires prevention of salt water intrusion on the coastlands, but also maintaining adequate soil moisture levels in the coastal clay soils which have low infiltration and permeability rates, management of flood waters in the two wet seasons, and effective distribution of water to crops in seasons of high evapotranspiration losses.

"Patterns of U.S. Female Market Work in an Era of Economic Restructuring"

By T. R. Lakshmanan, Center for Energy and Environmental Studies, Comm Ave. Boston University, MA 02215

A significant dimension of the evolution of the American labor market in the last three decades is the increasing level and quality of female participation. Not only are women increasing in absolute numbers but also in relative position in the labor force. Further, the historical pattern of their location in deadend occupations and declining industries seems to be yeilding to one in which women are less occupationally segregated appear in greater proportions in knowledge intensive activities and have earnings much closer to that of men. We analyse these patterns in the period 1971-1984, an era of a economic resturcturing. Utilising annual data on households in the U.S., we interpret the national and regional patterns in terms of not only various theories accounting for increasing similarities between male-female labor force participation, but also in terms of the forces of economic restructuring, that have differential impacts on different industries and regions.

SQUATTERS' SHANTY TOWNS AND URBAN PLANNING APPROACHES IN INDIA: AN EVALUATION by Dr. Amrit Lall, Department of Geography, University of Windsor, Windsor, ON N9B 3P4.

As a consequence of a massive and continuous inflow of rural-urban migrants, several major metropolises, and virtually all entirely planned cities in India are confronted by the sprawling, spontaneous, unplanned, and environmentally- and visibly-repulsive squatters' settlements. Accomodating approximately 30% of their population, these settlements have posed a nightmarish challenge to the planners and administrators, functioning within a severely restrictive politcal and financial environment. Basically, three approaches have been adopted, as in some other developing countries: first, to demolish and resettle in low-cost subsidized housing developments; second, to resettle in site-and-service projects, depending heavily on initiatives of the resettled; and third, to accept and upgrade some selected, long-established settlements through minimal environmental planning, housing subsidies, encouraging local initiatives. Success and failure of these approaches are evaluated in a few selected cities, including one planned city- Chandigarh. The need for more indepth and objective studies and workable solutions is emphasized.

AN ANALYSIS OF CANCER MORTALITY PATTERNS IN CHINA USING FRACTALS by Nina Siu-Ngan Lam and Hong-Lie Qiu, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, Louisiana 70803.

This paper examines the applicability of fractal models in analyzing socio-economic data collected and defined in polygonal form. A set of cancer mortality data collected by commune in the Taihu Region, China during 1973-75 is used. The number of polygons involved is about 1,100. This data set provides an interesting example of the typical problems involved in working with real-world data: it has irregular boundaries, lakes, rivers, and missing data. An algorithm for calculating the fractal dimensionality of polygonal surface is first presented. The dimensionalities of the three major cancer types in China - stomach, esophagus, and liver - are then calculated. Spatial autocorrelation statistics of the three spatial patterns are also calculated for comparison. Issues on the use of fractal model as a spatial statistic and the effects of various parameters on the fractal calculation algorithm, such as grid size, polygon size, and scale, are examined.

FISCAL IMPACTS OF RURAL LAND SUBDIVISIONS IN THE CATSKILLS by Richard F. Lamb, Center for Earth and Environmental Science, State University of New York at Plattsburgh, Plattsburgh, New York 12901.

This paper seeks to identify the fiscal impacts of the rural land sudivision and sales activity which has been sweeping the Catskill region of New York State beginning in the early 1980's. Many communities have welcomed the activity because of perceived tax benefits. However, this assumption has been questioned by conservation organizations and county planners, among others.

A sample of 24 rural land subdivisions located throughout the region were chosen for detailed study. In addition, fiscal data for municipalities which have been "hotspots" of land subdivision activity was examined.

The estimated long term fiscal impact of sample subdivisions varied widely depending upon the condition of the roads involved and other factors. Subdivisions requiring road reconstruction will cost more than the revenues they generate, while subdivisions along existing highways meeting modern design standards will provide a net benefit.

While it is too early to state with any certainty what the cumulative long term impact on town budgets will be, the analysis of what took place in the "hotspot" towns suggests that the land sales and subdivision activity may create more costs than revenues.

At best, beneficial fiscal impacts will be slight compared to the trade-offs in terms of environmental impacts and population growth generated.

JUXTAPOSED ELEMENTS IN A CULTURAL LANDSCAPE: CARROLL COUNTY, MD. by Ary J. Lamme III, Department of Geography, University of Florida, Gainesville, FL 32611.

A pastoral scene often invokes an implicit comparison between rural and town landscapes. If the pastoral represents a pure agrarian lifestyle, traditional values and virtue in man and nature, this is in contrast to an urban setting of uncontrolled change with environmental and moral degradation. These simplistic notions have never been accurate. However, if ever a place qualified as an exemplar of the rural ideal it was Carroll County, MD. This rolling countryside in the hills of Western Maryland, and its county seat of Westminster, bloomed as a mixed agriculture, small farm environment in the late 18th century. Although only 25 miles from Baltimore and 50 miles from Washington, D. C., Carroll County remained relatively isolated into the 20th century. This was attributable in large measure to poor, over-crowded roads. Then, in the mid 1980s, Interstate 795 was completed from the Baltimore Beltway to Carroll County. The resulting influx of commuters and development of housing has drastically altered landscapes of town and countryside, and changed their images as well. The landscape experiences of residents and visitors have also changed as a preserved townscape represents a refuge from despoiled rural areas. Photographs are used to illustrate these changing relationships.

STATISTICAL GENERALIZATION OF 3-DIMENSIONAL TERRAIN INFORMATION by R.L. Lammers and L.E. Band, Department of Geography, University of Toronto, Toronto, Ontario, M5S 1A1

We present a method for terrain generalization of watershed structure using an object description of the surface. Each object represents a topographic entity, either a hillslope or drainage link and can be generalized using spherical statistics. The basin may then be portrayed by a surface normal vector distribution on a unit sphere or by the moments of the spherical distribution. Utilizing the techniques of spherical statistics we can formalize such terrain descriptions and investigate the nature of the distributions both spatially (comparing spherical distributions between basins) and across scales (looking at different object generalizations in the same watershed.) Generalization can then be cast in terms of preserving or changing distributional information, rather than the qualitative 'appearance' of the terrain. The former is more important if terrain information will be used for subsequent analysis or simulation. Integration of the spherical information with some rudimentary geomorphological models, we can generate the full 3-dimensional characteristics of the basin from information limited to stream network topology and geometry.

ACTIVITIES ILLUSTRATING THE MOVEMENT THEME by F. Lampe, Southern Illinois University, Edwardsville, Illinois 62026

The "Five Fundamental Themes" are being used more and more by teachers as a conceptual framework for teaching geography. Activities that are specifically related to these themes will be useful to teachers, especially to those whose background in geography is limited.

In this presentation several activities related to the movement theme will be described. These activities were developed from data contained in the United Nations Yearbook of International Trade and the U.N. Food and Agricultural Organization Trade Yearbook.

While any trade figures are obviously related to the movement theme, the activities described in this presentation are based upon the trade in certain selected commodities and between selected countries that are particularly useful in providing the opportunity for expanding the class discussion into various other related areas. One of the areas that is emphasized involves the actions of governments which affect the movement of goods and in turn the countries that export and imoort. The imports and exports of sugar cane are used to illustrate these actions and also to illustrate the effect of changing eating habits.

Overall the activities can vividly illustrate the interdependency of peoples which, of course, is the basic premise of the movement theme. In addition, suggestions are presented for the construction of tables, charts, and maps that can help in illustrating and understanding the interconnections implicit in the movement theme.

MIGRATION AND THE TRANSFORMATION OF FRANCO-ONTARIAN IDENTITY by A. Langlois and A. Gilbert, Department of Geography, University of Ottawa, Ottawa, Ontario, K1N 6N5.

Franco-Ontarians, historically concentrated along the Ontario-Québec frontier, have recently assumed a more dispersed settlement pattern. Will the loss of the advantages traditionally associated with spatial concentration have negative impacts on the internal cohesion of this ethno-linguistic minority?

This paper describes recent migration patterns of Franco-Ontarians within predominantly English Ontario. Socio-demographic and socio-economic analysis demonstrates that migratory tendencies can seriously affect the survival of locally-based Franco-Ontarian communities. Diminution of cultural identity and denial of collective rights are among the expected outcomes of the territorial demise. On the other hand, results show a more spatially-concentrated francophone elite. A discussion will be conducted on the impact of such concentration on the emergence of new forms of social interaction within the group and on the eventual replacement of territory as a basis for community cohesion. The conclusion will raise the issue of ways open to dispersed minorities of sharing the North American continent.

DESEGREGATING THE COMPONENTS OF MAP FINISHING by Gail Langran, Intergraph Corp. 2051 Mercator Drive, Reston, VA 22091

The paper examines methods to integrate the components of map finishing and thereby emulate the processes and products of humans. The manual process of cartographic construction is fundamentally holistic and iterative. To produce comparable results by computer, the holistic task has been broken into component parts: compilation, coordinate transformation, feature selection, generalization, placement or displacement, and symbolization. The tendency has been to automate individual components, and then perform each in sequence. However, a sequential and segmented approach to map finishing is unlikely to produce results that are comparable to those of a human. To reach that end may require less specialization and more synthesis.

USING REMOTE SENSING TO MONITOR THE DECLINE OF KAREZ AGRICULTURE IN ZAMIN DAWAR, AFGHANISTAN by Kenneth J. Langran and John F. Shroder, Jr., Department of Geography-Geology, University of Nebraska at Omaha; Omaha, NE 68182.

For millennia the people of Afghanistan have regarded water as the prime resource of their land. In a region of such difficult topography and climate, the value of the rivers, ground water, lakes and melting glaciers to agriculture in the country has led to intensive use for a long time. This usage has commonly proceeded with little need for a clear understanding of the hydrologic interrelationships as long as basic and immediate water needs were met. Modern situations of increasing environmental and population stress and more than a decade of war in Afghanistan have done great damage to the country's irrigation systems.

Zamin Dawar, an area near the Kajakai Dam on the Helmand River in southwestern Afghanistan, has been irrigated for over 500 years by wells and underground karez tunnels that intersect the top of the water table. Two decades ago the region was highlighted by several independent irrigation studies, which provide a unique historical background for our ongoing monitoring of agricultural changes in Afghanistan. Reasons for the decline of ground water irrigation at Zamin Dawar include a variety of physical and economic or political causes: (1) long term climatic change; (2) declining water table; (3) salinization; (4) general lack of workers skilled in the construction and maintenance of karez; (5) war-induced economic decline; (6) nationwide political instability, and (7) direct local combat.

HOUSEHOLD RECYCLING: A CAUSAL ANALYSIS OF BEHAVIOR, COMMUNICATION CHANNELS, ATTITUDES AND DEMOGRAPHIC ATTRIBUTES by Florence Lansana and Milton E. Harvey, Kent State University, Kent, Ohio.

Household recycling is a complex decision process that is shaped by many factors. An existing body of research, while limited in scope, provides the basis for a set of causal models based on place types. This work builds on The Frazier Model (1989) of place-oriented recycling decisions and utilized a multi-variate statistical model. The model test the significance of the direct and indirect linkages between recycling behavior and three subsystems: individual, demographic attributes, communication preferences for recycling information and a set of rated mitigative factors, such as environmental beliefs, convenience and cost.

The model is tested using data from two curbside recycling demonstration projects: Endicott (old, small urban center) and Vestal (established, wealthy suburb), New York.

LAKE AND RIVER QUALITY (NOT WATER QUALITY) IN RECREATION MANAGEMENT by Christopher Lant, Department of Geography, Southern Illinois University, Carbondale, IL 62901-4514 and Jo Beth Mullens, Deaprtment of Geosciences, Oregon Sate University, Corvallis, OR 97331.

The concept of "water quality" -- the inverse of "pollution" -- has dominated research concerning water-based recreation. This paper argues that "water quality" is an over-used and often misused term when dealing with the recreational potential of a water resource. Based on the experience of two empirical studies, the concept of "lake quality" and "river quality" -- the inverse of "degradation" -- is constructed as a broader and more holistic alternative to the concept of "water quality" per se. Recreators' evaluation of the quality of a specific river or lake are based on their perception of its recreational potential and its perceived amenities. These in turn are generated not only by measured physical and chemical characteristics of the water, but by the physical characteristics and environmental setting of the waterbody, its location relative to recreators and other recreational opportunities, and the property status, available facilities, and regulations assigned to it. A framework is offered to analyse the interaction of these variables in their contribution to recreational lake and river quality that is widely applicable.

MODELING SNOW DISTRIBUTION IN PRAIRIE LANDSCAPES USING DIGITAL ELEVATION MODELS by D.R.LAPEN, University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0, and L.W.Martz, University of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0.

The distribution of snow in the Canadian Prairies has been empirically modeled using landscape stratification techniques. Most of these techniques are highly subjective and rely upon ill-defined topographic attributes. This subjectivity can be reduced using standardised topographic variables to objectively delimit landscape units.

The distribution of snow in a small Prairie basin near Saskatoon, Saskatchewan was examined during the 1988/89 winter season. Snow depth and density measurements were made at 741 regularly spaced sites over a 1/2 section of the basin. Measurements were made four separate times, once during maximum snow accumulation.

Computer programs were used to numerically measure morphological variables (i.e., slope gradient, slope aspect, contour curvature, profile curvature) and positional variables (i.e., catchment area, dispersal area, sheltering) from a digital elevation model of the basin. Several landuse variables were also considered.

Relationships between the topographic variables and snow depth and density, under different landuse variables, were examined. Topographic and landuse variables were then used to define landscape units. Tests were conducted to determine whether each landscape unit had a distinct snowcover character.

THE EVOLUTION OF THE AMERICAN WEST: COLORADO'S SAN LUIS VALLEY by A. Larson, Univ. of Illinois at Chicago, and J. Dietz, Univ. of Northern Colorado, Dept. of Geography, Greeley, Colorado 80639.

Colorado's San Luis Valley provides a 5000 square mile case study for the study of the evolution of the American West. Sandwiched between the Sangre de Cristo and San Juan Mountains, the "Valley" provided an isolated refuge for the Ute Indians through the first half of the 19th century. Since then, much has changed.

This paper traces the impact of each new dimension introduced: Spanish colonists who moved upstream on the Rio Grande in the 1850's, Mormon converts who heeded Brigham Young's dictum to colonize Deseret's outer reaches in the 1870s, General William Palmer's DRG&W Railway which siphoned Valley interests to the Colorado Front Range in the 1880s, Midwestern farmers who adapted their agricultural and grazing patterns to the Valley at the turn of the century and bonanza kings who spread the mining frontier into the northern end of the Valley. Now in the late 20th century, new entrepreneurs (eg., Malcom Forbes and Shirley Maclaine) focus on the Valley's "Sun Belt" qualities while others pursue its water rights for the benefit of distant urban realms.

The paper draws its inspiration from the concepts utilized by Donald W. Meinig in his 1971 book Southwest: Three Peoples in Geographical Change, 1600-1970 (Oxford University Press). The Valley offers ample evidence of these concepts.

NICARAGUAN REFUGEE ABSORPTION INTO THE COSTA RICAN ECONOMY by Elizabeth M. Larson, Department of Geography, UW-Milwaukee, P.O. Box 413, Milwaukee, WI 53201.

This paper examines the absorption of Nicaraguan refugees into the Costa Rican economy. A common perception of refugees is that they are dependent non-agents. They are often seen as social burdens on host governments, viewed with suspicion by the citizens as parasites invading the saturated job market, and as importers of revolution and disease. To worsen matters, due to a declining economy, rising debt, and growing unemployment, the Costa Rican government has revoked article 17 of The Convention Relating to the Status of Refugees concerned with "wage-earning employment."

Adopting an interpretivist strategy--structuration theory--I offer an alternative perspective. By analyzing Costa Rican refugee integration--with field data from both refugees and administrators--the process is identified by which successful absorption has occurred. That this should be possible, notwithstanding Costa Rica's economic problems and hostility from others in the local society, may offer wider lessons. Groups of Nicaraguan refugees are now contributing to the Costa Rican national economy. By studying their case histories we can begin to discard the negative characteristics usually ascribed to them and show how they can be integrated as valuable productive members of the host society.

POPULATION DENSITY AS A DETERMINANT OF URBAN RADIANT TEMPERATURES by Walter Carnahan, Department of Physics, Indiana State University, Terre Haute, IN 47809, and Robert Larson, Department of Geography and Geology, Indiana State University, Terre Haute, IN 47809.

The strength of the urban heat island effect has not shown a strong correlation with simple measures of city size, such as population. However, a significant relationship between heat island strength and urban population density can be demonstrated at the intercity level. Here, the relationship between thermal data and residential land use density is examined at the intracity level for a study area within Indianapolis, Indiana. The land use data are derived from planning maps digitized on an ERDAS system. Geocorrected Thematic Mapper data were registered with the digitized planning maps. Employing thermal data of 120 meter resolution and residential land use patterns developed from zoning patterns within the area, significant relationships between thermal patterns and residential density are demonstrated. These relationships were refined by the elimination from the study area of extraneous (water and other underdeveloped features) pixels as identified by multispectral classifiers. It is suggested that this study and future research along similar lines may allow planners to assess the contributions of specific elements within land use plans to the overall urban heat island effect.

THEORY AND METHOD IN HUMAN GEOGRAPHY: HISTORICAL MATERIALISM SAYS IT ALL by Mickey Lauria, College of Urban and Public Affairs, University of New Orleans, New Orleans, LA. 70148

Rather than develop a conceptual argument on how to conduct research in the "Post Everything Era", I analyse specifically what I have done in my last two major research projects: a comparative analysis of local political changes in response to manufacturing plant closures and the role of gay community development in gentrifying a neighborhood in New Orleans. This analysis provides the basis for a reconstruction of my views on appropriate research strategies, a foil from which to discuss current epistemological, methodological, and theoretical debates in Human Geography, and a discussion of the lessons learned. In particular, I discuss theories of causality (social construction, etc.), appropriate unit of analysis (the fallacy of structure versus agency, organizational dialectics, etc.), research design (case study, quasi experimental design, etc.), theory evaluation, and the necessary connections between them.

WHY AN "ELECTRONIC" ATLAS? by Richard M. Smith, Dept. of Geography, U. of Arkansas, and Stephen Lavin, Dept. of Geography, U. of Nebraska.

Virtually all atlases produced before 1980 were bound collections of printed maps, and associated graphs, tables and text. Within the last decade some organizations have begun to construct electronic atlases. These are similar in concept to printed atlases, but depend on computers and crt's for their use. Maps are stored as bit-mapped images, and accessed through a user-interface which permits atlas users to select the spatial information they require. One of the earliest examples of this infant technology is NASA's Decision Information Display System (DIDS), developed primarily as an aid to governmental policy making. A more recent effort is the Electronic Atlas of Arkansas, now designated as the official state atlas of Arkansas.

This paper addresses the question, "Why should electronic atlases be made instead of printed atlases?" We consider the question from both the cartographer and map-user's viewpoints. Cartographic procedures in map construction include assembling, processing and compiling a variety of data, and encoding data in symbolic form. For the cartographer, electronic atlases are practicable only if they improve the efficiency of these activities. For the map-user, electronic atlases are an improvement only if they are more informative, easier to use, or more interesting than printed atlases. Ideally, electronic atlases should offer features to cartographers and map-users that printed atlases either cannot, or do not.

CLIMATIC CONTROLS GOVERNING DENGUE-TRANSMITTING POPULATIONS OF AEDES AEGYPTI IN PUERTO RICO by T. A. Lavin, Department of Geography, University of Delaware, Newark, Delaware 19716.

Dengue causes more morbidity and mortality than any other mosquito-borne arbovirus. In Puerto Rico, 223,808 reported dengue cases between 1977 and 1980 resulted in an actual cost of 6 to 15.6 million dollars, not including adverse effects on tourism due to publicity.

Aedes aegypti is the primary vector of dengue in Puerto Rico. Mosquito populations are weather dependent, with specific temperature and moisture limits on activity, blood feeding, and hatching of the eggs. Dengue transmission in Puerto Rico is an annual event, and previous research has attempted to link dengue outbreaks to phases of the annual weather cycle. Such previous research has concentrated on links with single weather variables.

This paper examines how population increases of Aedes aegypti in Puerto Rico result from a combination of climatic conditions over the entire life cycle of the mosquito. Specific combinations of temperature and moisture availability during key phases of the mosquito life cycle are considered. The goal of this research is to identify the primary climatic controls of a transmitting population in order to model an outbreak event.

THE LEGACY OF THE JOHNSTOWN FLOODS by M. P. Lavine, University of Pittsburgh at Johnstown, Johnstown, PA 15904.

On the afternoon of May 31, 1889, the failure of the South Fork Dam caused a wall of water to rush through the narrow, winding valley leading into Johnstown, Pennsylvania, destroying most of the city and killing over 2200 people. One hundred one years later, the 1889 Johnstown Flood still ranks, along with the Chicago Fire and the San Francisco Earthquake, among the most well known and severe disasters experienced in the United States.

This paper examines the legacy of the Johnstown Flood of 1889 and subsequent floods of 1936 and 1977. It concludes that the most enduring legacy of the floods lies not in their impact on land use, settlement patterns or economic development, for these were only moderately affected. Rather, the most profound effect has been the cultivation of an aura of a Johnstown which, while externally perceived as a flood stricken community, is instead a tough, vibrant community that has repeatedly overcome adversity. This "triumph of the human spirit" (the official slogan of the Flood Centennial Commemoration), with its roots planted in a nineteenth century disaster, has evolved into a theme that permeates all aspects of community activity, including efforts to recover from decades of decline in basic steel and coal industries, the development of a local tourism initiative, and the celebration of a rich and largely intact ethnic heritage.

THE DEVELOPMENT OF A GREAT LAKES COASTAL ZONE DATA BASE AND ITS APPLICATION IN HAZARD SHORELINE MANAGEMENT

by M.H. Law, Ontario Ministry of Natural Resources, Queen's Park, Toronto, Ontario M7A 1W3, D.E. Coleman, Environment Canada, Canada Centre for Inland Waters, Burlington, Ontario L7R 4A6, and F.J. Horvath, Michigan Department of Natural Resources, Lansing, Michigan 48909.

In 1986 the Government of Canada and the United States forwarded a Great Lakes Water Levels Reference to the International Joint Commission (IJC). The Reference asked the IJC to examine and report upon methods of alleviating the adverse consequences of fluctuating water levels in the Great Lakes-St. Lawrence River Basin.

In order to respond to this request it was necessary to assemble a coastal zone data base which included a broad range of environmental, physical and social information. Due to the bilateral nature of the study this exercise required the development and approval of data standards and criteria between the various Canadian and U.S. agencies involved.

The purpose of this paper is to describe the development of the Great Lakes coastal zone data base and illustrate how it is currently being used through Geographical Information Systems in the management of shoreline hazard areas and in the assessment of methods designed to alleviate the adverse consequences of fluctuating water levels.

URBAN RESTRUCTURING AND THE GEOGRAPHY OF LOW-SKILL WORK

by Robin Law and Jennifer Wolch, School of Urban and Regional Planning, University of Southern California, Los Angeles CA 90089-0042

The literature on urban restructuring has grown dramatically over the past decade. This work has focussed largely on aggregate shifts in sectoral and skill mix in western capitalist urban economies, thus emphasizing the decline of Fordist manufacturing sectors, the growth of producer and consumer services (especially FIRE), and the emergence of new agglomerations of vertically-disintegrated firms, particularly in high-technology. Associated changes in labor demand have also been identified, and the emergence of a bimodal skill/wage structure has been documented. However, little attention has been given to the intrametropolitan geography of work, i.e. how the distribution of jobs characterized by sector, skill levels and remuneration rates has changed under the forces of economic restructuring. This paper provides an empirical analysis of the changing spatial organization of low-skill work in Los Angeles, based on 2-digit employment and skill/training data for community areas within Los Angeles County for the period 1976 and 1984. Findings suggest a growing concentration of low-skill employment, and a shifting distribution of low-skill work among industrial sectors.

DIFFERENTIATING CHANGES IN CLIMATIC VARIABILITY IN SOUTHWESTERN COLORADO

by E. Law-Evans, F.M. Smith, both of Department of Earth Resources, Colorado State University, Fort Collins, Colorado, USA, 80523, and P.W. Mielke, Department of Statistics, Colorado State University, Fort Collins, Colorado, USA, 80523.

Delineating changes in climatic time-series variability can be approached through the powerful non-parametric techniques provided by multi-response permutation procedures (MRPP). The non-parametric nature of MRP procedures precludes normality assumptions required by many techniques. The time series of Silverton, Durango, and Vallecito Dam annual precipitation totals and Vallecito Creek near Bayfield annual streamflow are examined through the new technique.

Series of "moving-MRPP" values (analogous to a moving-average series) of 10 years for the precipitation series and 5 years for the streamflow series were generated. Using moving-MRPP as an exploratory technique, analysis of the four sites' historical records suggested two region-wide changes in variability during the period of record: first, a period of low climatic variability from 1958 to 1971. Second, a period of highly variable conditions from 1979 to 1982. Further research may include investigation of seasonal precipitation time-series variability and changes in precipitation frequency distribution variability.

REGIONAL PATTERNS OF CHANGE IN COMMERCIAL SMALL FARMS IN METROPOLITAN AREAS

by Henry W. Lawrence, Department of Geography, Western Michigan University, Kalamazoo, MI 49008.

Small farms in metropolitan areas are often blamed for a variety of land use and agricultural problems. While most small-area farms are low-sales "hobby" farms, a significant minority are productive enterprises. This study compares rates of change in the numbers of small farms of both types from 1978 to 1987 in metropolitan counties in four regions of the U.S.: southern Megalopolis, the southern Great Lakes, the Corn Belt, and the Pacific Coast. Census of Agriculture data for farms less than 50 acres with sales above or below $10,000 show that the commercial farms increased at a faster rate than hobby farms in all four regions, most rapidly on the Atlantic and Pacific coast regions.

In all four regions the commercial small farms have become a larger minority among small farms, but the opportunities for growth in small commercial farming appear to be influenced by regional patterns of urbanization and agriculture. Greater opportunities seem to exist in regions of rapid suburban growth and with a diverse mix of crop and livestock commodities Small commercial farms are an important sector of agriculture in metropolitan areas of these regions.

MIGRANT AND SEASONAL FARMWORKERS IN PITT COUNTY, NORTH CAROLINA

by Palmyra M. Leahy, Department of Geography and Planning, East Carolina University, Greenville, North Carolina, 27858.

Pitt County, North Carolina, with 2,395 permanent employees in the agricultural sector, and with a rural population of 45,338 persons is expected to receive over 3,50[illegible] migrants this year. This data provided by the Employment Security Commission is an estimate and the number can reach twice as many. The lack of dependable data on migrants and seasonal farm workers makes it difficult to provide adequate social services to the workers and their dependents.

Between 1980-1985 188,000 migrants moved into North Carolina making it the 6th largest recipient of net-in-migration. This rate has increased so that in 1988 alone, the state received 29,062 migrant workers and 150,441 seasonal workers. These numbers will quadruple if the dependents are counted.

The data collected for this work was obtained through the Employment Security Commission, from Telamon (a private, non-profit organization under contract with the U.S. Department of Labor to provide training services to farmworkers) from Social Services and local Health Departments, as well as interviews with farmers and the workers themselves.

The objective of this work is to describe what is available to the migrant worker as far as social services are concerned, and to analyze how the new immigration laws have had an impact on the numbers of migrants in the state and in the area.

VILLAGIZATION IN ETHIOPIA AND THE ROLE OF INTERNATIONAL AID

by J. Harold Leaman, Villanova University, Villanova, Pennsylvania 19085-1699

Ethiopia caught the attention of the international press during the 1980's as a country in real need of food aid to prevent mass starvation. There is mounting evidence that the villagization program of the military government of President Mengistu Haile Mariam contributed to the severe drought problems of 1984-1986. In addition, the huge influx of famine relief aid provided a stabilizing influence to the regime. Private humanitarian aid and bilateral and multilateral development agencies in effect provided the food resources as well as trucks, grain-storage bins and wells that enabled the government to concentrate on the social and political objectives of villagization. An analysis is made of the villagization program in light of opposition movements within the country. The policy implications and options of international donor agencies are also examined.

Low-Frequency Mid-tropospheric Variations And North American Temperature Variability by Daniel J. Leathers, Department of Geography, 317 Avery Hall, University of Nebraska-Lincoln, Lincoln, NE 68588-0135.

Recent studies indicate that hemispheric scale mid-tropospheric teleconnections play an important role in regional temperature and precipitation variability. Moreover, low-frequency variations (monthly to seasonal) of the mid-tropospheric height field also occur on smaller spatial scales. Evidence indicates that variations of the height field occurring over the North American continent may be a product of hemispheric scale teleconnections and/or interactions between several.

A 55-point grid of mean monthly 700 mb height values for the North American sector was subjected to factor analytic techniques in order to isolate the main modes of mid-tropospheric variation over the continent, on a monthly basis. The monthly score time series of the principal factors were correlated with mean monthly temperature values for all 344 coterminous United States climate divisions and several Canadian stations. Results indicate that continental scale mid-tropospheric variations account for a significant portion of regional temperature variability during all months of the year. In addition, the score time series of the primary factors were regressed against indices of several dominate hemispheric teleconnections. Results suggest a strong relationship between the hemispheric and continental patterns. These conclusions may have important implications in assessing the reliability of temperature projections made by general circulation models.

THE SPATIAL BEHAVIORS AND SOCIAL NETWORKS OF AUTO THIEVES SNARED BY A POLICE STING OPERATION by J.L. LeBeau, Center For The Study of Crime, Delinquency, and Corrections, Southern Illinois University, Carbondale, IL 62901, and R. Langworthy, Dept. Of Criminal Justice, University of Cincinnati, Cincinnati, OH 45221.

Property crime stings are special police projects that seek to provide thieves and receivers of stolen property the opportunity to sell stolen property to what appears to be a criminal fence. In order to inject themselves into a stolen property distribution system the police must decide where to locate the sting storefront for attracting thieves and stolen property. This research examines an auto theft sting conducted by the police in Birmingham, Alabama during 1985 - 1986. Three questions guide this research: 1) How does the location of the sting storefront influence the spatial behavior of auto thieves? 2) How does the location of the sting storefront influence the spatial patterns of theft? and 3) What are the impacts and ethical concerns of this locational decision made by the police? In other words did this tactic control crime in the immediate neighborhood or present the opportunities for creating additional crime?

AN EMPIRICAL MODEL FOR FLOW-FREQUENCY ANALYSIS IN BRITISH COLUMBIA, by D.W. LeBoutillier and P.R. Waylen Department of Geography, University of Florida, Gainesville, Florida, 32611.

Modelling of the annual flood remains as one of the most common approaches in hydrologic research, however recent research is beginning to include the next few highest flows in a year. As more flows are included in the determination of flood risk, the question becomes how many of these additional flows to include, and why.

Statistical theory provides a set of assumptions that if met, can provide a complete model for the annual flow-frequency regime. Probability distributions and the parameters of those distributions can be predicted. Relaxing the assumptions of the theoretical model permits application of theory to observed data.

This paper will discuss the use of all available flow records in determining the flow-frequency characteristics of a river. As well, the effects of generating processes can be identified and included in the empirical model.

HYDROGLACIOLOGY OF CONNESS GLACIER, CALIFORNIA by Scott A. Lecce, Department of Geography, University of Wisconsin, Madison, Wisconsin 53706.

Proglacial meltwater acquires its solute load from water passing slowly through subglacial channels where chemical enrichment occurs, while water from surface ablation flows quickly through englacial channels without gaining solutes. Electrical conductivity is a surrogate for solute load which can be used to separate total meltwater flow into subglacial and englacial components. The purpose of this study was to describe short-term variations in solute load from a small alpine glacier in order to evaluate englacial and subglacial components of the total meltwater discharge, and to relate these variations to micro-meteorological conditions at the glacier surface.

Conness Glacier is located in a small northwest-facing cirque in the eastern Sierra Nevada. Discharge and conductivity of the proglacial stream were measured on an hourly basis for a ten day period during the 1989 ablation season. Diurnal fluctuations of conductivity varied inversely with the discharge hydrograph, and depended strongly upon meteorological conditions. During days with predominantly clear skies and high surface ablation, conductivity decreased abruptly by mixing with hydrochemically dilute englacial flow, and increased slowly following the peak daily discharge as the proportion of solute-enriched subglacial flow increased. Increased albedo and lower incoming shortwave radiation during a light snowfall event produced a 50% reduction in the daily peak discharge, and a two-fold increase in conductivity. The englacial flow component dominated proglacial discharge.

THE GEOGRAPHICAL MOBILITY OF HISPANICS IN THE UNITED STATES by J. Ledent, INRS-Urbanisation, Université du Québec, 3465 Durocher, Montreal, Quebec H2X 2C6

This paper throws some light on the volume and direction of spatial movement by Hispanics, as shown by information drawn from the 1980 U.S. Census. Both macro data--contained in the relevant tabulations appearing in various Census publications--and micro data--contained in the PUMS file released by the U.S. Bureau of the Census--are used to determine the major characteristics of migration and residential mobility among Hispanics.

The exposition begins by examining the volume of movement and its variations across states for three different mobility concepts (change of residence, intercounty migration, and interstate migration). Particular attention is given to contrasting the mobility/migration patterns thus uncovered with those observed for the general population.

An analysis of the three types of mobility is further presented by disaggregating the observed flows by various characteristics of the Hispanic movers or migrants. These characteristics include those commonly used in migration studies: sex, age, education, labor activity, income etc.). Also included are some characteristics that are especially relevant here: origin (Mexican, Cuban, South American, or other) and language use (unilingual English, bilingual, or unilingual Spanish).

TRIANGULATING IRREGULARLY DISTRIBUTED ELEVATION DATA. by Jay LEE, Department of Geography, The University of Georgia, Athens, Georgia 30602, U.S.A.

Surface representation is a usual requirement in geographic data processing. Available digital terrain data are increasingly dense raster models produced by automated orthophoto machines or synthetic aperture radar. An efficient alternative to dense grids is the Triangulated Irregular Network (TIN), which represents a surface as a set of non-overlapping contiguous triangular facets, of irregular size and shape. There existed several algorithms for extracting TINs from grid DEMs as well as several methods for triangulating extracted vertices. Problems are then how various algorithms and methods would perform on different types of terrain surfaces.

This paper examines the performance of various triangulation methods on different types of terrain surfaces. Vertices constructing TINs are extracted from USGS 7.5 minute quadrangle DEMs. Greedy Add, Delaunay, and hierarchical triangulations are then used to construct TINs for the extracted vertices. Finally, surfaces approximated by three triangulation methods are compared with the surface represented by the original grid DEM.

THE RED RIVER BOUNDARY DISPUTE: A CASE STUDY IN POLITICAL GEOMORPHOLOGY by David A. Waits and Jeffrey A. Lee, Department of Geography, Texas Tech University, Lubbock, TX, 79409-1016.

The channel of the Red River delineates much of the border between Oklahoma and Texas. Geomorphic processes were not understood or adequately considered in the establishment of this boundary which have created unresolved political problems for most of this century. The study area of this paper is the border west of the 98th Meridian. Disputes have resulted from 1) careless definitions of border locations within the channel and 2) the fact that the upper Red River has an unstable braided channel. The northern boundary of Texas has been established as the south bank of the Red River. The southern boundary of Oklahoma is the "middle of the main channel" of the Red River. The ownership of the southern half of the main channel became a contested issue in 1918 when oil was discovered and drilling within the channel commenced. Legal precedent has established that a boundary changes with a channel if the the stream migrates by accretion or erosion but the boundary does not change if the channel changes by avulsion. The U.S. Supreme Court, in 1923, ordered a determination of the location of the south bank of the channel in 1821 along with a determination of subsequent channel migration and avulsion in order to delineate the border at that time. Such information was impossible to acquire to the satisfaction of all concerned and the dispute continues to the present with the two states, the U.S. Bureau of Land Management, the Kiowa-Comanche-Apache Indian Tribes, counties, municipalities and individual citizens involved. Political problems have been exacerbated by channel changes along the upper portion of the Red River, which originally had a sandy, braided channel with highly variable discharge and frequent channel changes. During this century, invasion by exotic plant species, such as tamarisk, and upstream control structures have complicated the fluvial system by constraining the stream to a smaller channel and increasing the frequency of channel avulsion. The Red River boundary dispute is a useful case study of the difficulties which arise when legal decisions involving streams are made without an understanding of fluvial processes.

THE SPATIAL IMPACT OF ECONOMIC DEVELOPMENT ON FERTILITY IN CHINA by Jessica P-L. LEE, Ohio State University, Columbus, Ohio, 43210

The remarkable fertility decline in the People's Republic of China occurred at a time when economic growth rates surged upwards. Economic development, though in face of strong government population policies, is still relevant to demographic change. Given the diversified socio-economic differentials in the vast territory, the impact of economic development on fertility is not constant over space. The objective of the paper is to discuss the spatial patterns of the variant relationship at the county (xian) level. Three densely populated regions, the NORTH, the EAST and the SOUTH, are the area under study. Their respective metropolitan centres, Beijing, Shanghai, and Guangzhou, are assumed to have substantial influence on the relationship between economic development and fertility in the surrounding areas.

For testing the hypothesis that there is a spatial drift in the effect of economic development on fertility, the expansion method is used. It is a procedure for generating a 'terminal' regression model from an over-simplified 'initial' one by expanding the parameters of the initial model with functions of some distance variables. The terminal model is tested at different levels of urbanization in the three regions for comparing the regional urban-rural dichotomy of fertility decline. The regression results validate the hypothesis that the impact of economic development on fertility varies with distance from the metropolitan centres. Moreover, due to the different dominating characteristics of these centres, the spatial patterns of the relationship reveal significant regional diversity at different levels of urbanization.

URANIUM MARKET MODEL by Russell Lee, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37831-6205.

The Uranium Market Model makes regional projections of the worldwide uranium market. The model uses a microeconomic simulation in which uranium supplied by the mining and milling industry is provided to meet the demand for uranium by electric utilities with nuclear power plants. Supply comes from uranium production centers, producers' stockpiles, and utilities' excess inventories which are drawn down or sold in the secondary market. Demand consists of utilities' nuclear reactor requirements, contingency inventory demand, and any additional market demand resulting from contract over-commitments with either producers or enrichment facilities.

The model is dynamic in that: the market projections in any given year are determined by past years' activities, such as market prices and decisions to defer production of reserves; the projected years' demand levels are affected by reactor requirements in future years; and unanticipated changes in future demand may be introduced exogenously so that market activities in any forecast year may be constrained by actions taken in previous years before the unanticipated event occurred.

The model has the capability to consider many policy-related situations that will have some bearing on future market outcomes. Annual projections are calculated for the uranium market for each major producing and consuming country or region in the world.

THE DISTRIBUTION OF GLUCOSE-6-PHOSPHATE DEHYDROGENASE (G6PD) DEFICIENCY IN SARDINIA WITH REFERENCE TO FAVISM by J. Webster Leech San Francisco State University, San Francisco, California 94132.

Glucose-6-phosphate dehydrogenase (G6PD) is an enzyme which controls metabolism in red blood cells. When individuals are deficient in this enzyme, they may develop an acute anemia, favism, after ingesting the bean, *Vicia faba*. Susceptibility to favism depends on an individual having the genetic trait for G6PD deficiency. Sardinia has the highest incidence of favism in the world, as well as high frequencies of G6PD deficiency.

While many aspects of the etiology of favism have been revealed through research on the genetics of G6PD deficiency and on the biochemistry of the faba bean, factors influencing the distributional patterns of the genetic trait remain obscure. Using a geographic information system, gene frequencies from villages throughout the island were correlated with environmental variables, such as altitude, barometric pressure, precipitation and temperature.

AN EVALUATION OF PROCEDURES TO ESTIMATE MONTHLY PRECIPITATION FREQUENCIES by David R. Legates, University of Oklahoma, Norman, Oklahoma 73019.

Many applications in agriculture, engineering, and water management require information regarding the frequency of precipitation events. Existing precipitation time-series, however, are not usually of sufficient length to determine adequately the true shape of the distribution. As a result, a statistical probability density function often is assumed and fit to the existing time-series to facilitate the prediction of precipitation probabilities. The accuracy of these estimates, however, depends on the choice of the probability density function.

Presently, many probability density functions are employed to estimate monthly precipitation frequencies. Gumbel, log-Pearson, Gamma, log-Normal, Normal, Square-Root Normal, or Cube-Root Normal distributions are frequently used. In 1983, an inquiry to each of the member nations of the WMO indicated that seven different probability density functions were currently in use as a standard. The selection of a density function, however, is often made by subjective decisions, historical traditions, or by its simplicity and convenience of use. Quantitative appraisals are usually never addressed.

Results indicate that the Box-Cox transform Normal density function is better able to represent precipitation probabilities than other distributions currently in use. This assessment was made using a cross-validation procedure for 253 stations from around the world for which at least 100 years of record were available. Good results were obtained when the procedure was applied to 703 stations which had a time-series exceeding 50 years.

CONGRESSIONAL PARTISAN GERRYMANDERING IN THE 1980s: THE CASE OF INDIANA by Jonathan I. Leib, Syracuse University, Syracuse, New York 13244-1160.

With the Supreme Court's 1986 ruling that partisan gerrymandering, at the state legislative level at least, is a justiciable issue, it is reasonable to assume that in the 1990s the Court will address the issue of partisan gerrymandering at the Congressional level. While most of the scholarly work on Congressional partisan gerrymandering in the 1980s has centered on the California case, it is important to recognize that other states have operated under intended Congressional partisan gerrymandered plans. This paper examines the case of one of these other states: Indiana. While Republicans drew Indiana's Congressional districts in 1981 to give themselves seven of Indiana's ten seats, it is the *Democrats* who currently hold seven seats in Indiana's Congressional delegation. In examining specific districts, this paper argues that incumbents' effective use of resources, the importance of local issues, the effect of partisan decline on open seat elections, as well as other factors, have undermined Republican intentions and led to the complete failure of Indiana's Congressional partisan gerrymander. Indiana's experience, as well as that of other states, should be considered along with California's when discussing the current effectiveness of Congressional partisan gerrymandering.

ROXANA LOESS OF THE UPPER MISSISSIPPI VALLEY: GENESIS AND PALEOENVIRONMENT by D.S. Leigh, Department of Geography, University of Wisconsin, Madison, Wisconsin 53706.

The Roxana loess is the lower of two Wisconsinan-age loess deposits in the Upper Mississippi Valley region. Currently, disagreement exists in the literature about the genesis and paleoenvironment of the Roxana loess. Some investigators propose that the Roxana loess had a non-glacial origin which contrasts with the more conventional idea that it was derived from floodplains composed of glacial outwash. Non-glacial proponents suggest that the loess was generated from local sources or that it was principally generated from lake sediment discharged southward from the Chicago outlet of lake Michigan.

Several Roxana loess sites have been studied along the Upper Mississippi Valley between Rock Island, IL and LaCrosse, WI. Trace element (Pb & Zn), mineralogical, and particle size analyses were used to test the origin of the Roxana loess. Preliminary results suggest that the Roxana loess is glacially derived because its characteristics do not vary significantly from the overlying Peoria loess of glacial origin. These results infer that the middle Wisconsinan time was characterized by climatic conditions that supported a Laurentide ice sheet in the headwaters of the Upper Mississippi Valley.

THE CHANGING EARNINGS DISTRIBUTIONS OF U.S. REGIONS by Nancey Green Leigh, Dept of Urban Planning, University of Wisconsin, Milwaukee, WI 53201

This paper makes a contribution to the broader area of recent inquiry into whether the middle economic class of the United States is shrinking by specifically examining regional change in the distribution of earnings from 1967 to 1987. Using microdata from the Current Population Survey, full-time and part-time workers' distribution of earnings among the low, middle, and upper earnings segments is examined by race, sex, and education level, by three different industrial/production classifications for the U.S. as a whole, its rural and urban regions, its four major Census regions and their largest states.

The underlying premise of this research is that the postwar boom era has been widely perceived as a period in which the earnings of one full-time worker could purchase a middle standard of living for a household. Further, the most important consumption item of this middle standard of living was (and continues to be) home ownership. Thus, an additional focus of this paper is change in the purchasing power of full-time earnings for homeownership is tracked between 1967 and 1987 at the regional level.

My research indicates that full-time workers have seen a dramatic upwards shift in their earnings distributions in all regions accompanied by substantial erosion in the purchasing power of their earnings. The shapes of earnings distributions across regions have converged over the last two decades but the costs of homeownership have diverged. As a result, although the ability to consume a middle standard of living has decreased nationwide, certain regions offer locational advantages for consuming a middle standard of living.

URBAN OFFICE MARKET DYNAMICS: NATIONAL CYCLES AND LOCAL TRAJECTORIES by Helga Leitner, Department of Geography, University of Minnesota, Minneapolis, MN 55455.

During the last 25 years investment in and construction of office space in the US national economy has exhibited not only a major secular growth trend, but also strong cyclical behavior. Although these developments have stimulated substantial research into the timing and causes of commercial real estate development at the national level, relatively little attention has been paid to the significant variations in these trends between and within metropolitan areas.

The purpose of this paper is to first examine the degree of variation in the volume and timing of office construction in the downtowns of 6 major central cities in the US as compared to national trends during the last twenty five years, in order to separate nationwide trends from city-specific developments. The evidence will be presented as important sources of insight into the dynamic of local office development. Second, national and local trends will be analyzed using a conceptualization which takes into account exogenous and endogenous forces impinging on the operation of the commercial real estate market.

Much of the previous theory developed to explain temporal trends in real estate development has concentrated on the importance of either the demand of final users or the lag between start and completion of real estate projects as primary causes for cyclical fluctuations. In contrast, the explanatory framework developed here contends that volume and timing of commercial real estate development is critically related to supply side factors, which in turn are closely linked to processes of economic and political restructuring occurring at different spatial scales. In addition it is argued that variations between cities have to be understood as the combined result of the differential impact of larger processes of economic and political restructuring and the specific nature of the local context.

TORONTO: "THE CITY THAT WORKS" BY James Lemon, Geography Department, University of Toronto, Toronto M5S 1A1

Almost invariably American and other visitors comment that Toronto is clean and safe. Over the century, its systems of management have indeed worked very well. Besides Toronto has innovated, notably through the creation of Metropolitan Toronto in 1953. Other signs of leadership have been in public health, housing and mass transportation. A substantial number of citizens participate in voluntary group such as residents' associations and have throughout Toronto's history. Since 1793 when founded and 1834 when incorporated, it has managed growth spurts with relatively little stress. The dialogue between the local municipalities, Metro and the province continues to focus on issues of development and management.

Toronto has grown enormously in the 20th century. Catching Buffalo during a rapid spurt between 1900-1912, from 1945 onward it has witnessed steady growth. Today it is about sixth on the continent at about 3.8 million. Racial and ethnic stress has been limited. Multiculturalism was built on what was still a very British city in 1940. And it is affluent.

Current growth has strained systems; now only two-thirds of Torontonians live with Metro's boundaries. Hopefully residents and their governments will reassert civic rectitude (doing the right thing) once again to find solutions.

KING ST.E.
220
SHERBOURNE ST.
52

THE CLAG EXPERIENCE by Barry Lentnek, Department of Geography, SUNY-Buffalo, New York 14260, Gary S. Elbow, Department of Geography, Texas Tech University, Lubbock, Texas 79409, and A. Richard Longwell, Department of Geography, Western Illinois University, Macomb, Illinois 61455. Organized and chaired by Tom L. Martinson, Department of Geography, Auburn University, Auburn, Alabama 36849.

In 1990, the Conference of Latin Americanist Geographers (CLAG) is twenty years old. The experience of establishing, maintaining, and improving the activities of this professional association has touched the careers of hundreds of geographers and scholars in related fields. This panel by three leaders of the "CLAG Experience" offers insights into the nature and practices of this organization and what has made it successful.

THE JOURNEY TO WORK IN JAKARTA'S KAMPUNGS by Ralph Lenz, Wittenberg University, Springfield, Ohio 45501.

Urban theory suggests that squatter settlements in Third World cities may provide their residents with access to a variety of nearby job opportunities. This paper is a descriptive analysis of work trips by residents of low-income areas of Jakarta. Data were collected in a 1985 household survey conducted at eleven kampungs in various locations within the metropolitan area. Both point pattern statistics for the job sites and trip distances vary considerably from kampung to kampung, but not in a manner predictable by location within the metropolitan area.

Examination of occupation types reveals trip distance differences that are particularly pronounced for activities that would be considered part of the informal sector of the urban economy. Associations of occupation types and trip distances with household socioeconomic status indicators and environmental characteristics of the household site are explored.

THE OPERATIONAL PATTERN OF VESSELS PLYING LAKE SUPERIOR

by Gordon L. Levine, University of Minnesota-Duluth, Duluth, Minnesota 55812.

Vessel operations on Lake Superior are part of a larger Great Lakes system, even extending into the world shipping lanes with the St. Lawrence Seaway. Most, but not all, vessel oeprations on Lake Superior have an origin or destination outside the lake itself. The traditional explanation of Lake Superior water transportation is that lake boats carry iron ore or grain from Upper Lakes' ports to the Lower Lakes and return with coal. To determine the accuracy of this generalization, I analyzed vessel operations and schedules to sort out the structure and geographical linkages of Lake Superior traffic.

I collected 1989 vessel arrival and depature data for most major ports and Soo Locks passage data. Vessel operations were then categorized into specific routes or areas.

Analysis indicates that a major expected difference exists between Canadian and United States flag vessels. US vessels operate exclusively between US ports, while Canadian vessels move domestic Canadian traffic plus all cargoes moving between the two nations. Round trips by US vessels at 5-7 days are much shorter than many Canadian vessels that can take 15-20 days for a round trip between Lake Superior and the Lower St. Lawrence River. These traffic characteristics are partly the result of construction in 1969 of a bigger dimension navigation lock at the Soo which accommodates the building of 1,000" vessels that can play only the 4 Upper Lakes. Twenty-nine newer US lake vessels built to this enlarged lock scale are thus restricted to service on the Upper Lakes. However, the many new Canadian vessels are built to allow free access to Lake Ontario and the St. Lawrence Seaway. A final major research result is that many US vessels during the 1989 shipping season exhibited a more complex shipping schedule involving three or more cargoes moving between three, four or more ports.

ACCULTURATION AND TOURISM ON NATIVE AMERICAN RESERVATIONS

by Alan A. Lew, Northern Arizona University, Box 15016, Flagstaff, Arizona 86011. (CMSAAL001@NAUVM)

Distinct Native American values and identity have persisted despite five centuries of efforts to acculturate and assimilate Native peoples. In the past, geographic isolation, language barriers and traditional patterns of inter-cultural contact lessened the acculturation pressures on most tribal groups.

Today, tribes have increasingly better access to nearby rail lines and Interstate freeways. These bring large quantities of goods and people both to and from the reservation and increases the pressure on tribes to adopt the values of the dominant American society. This is particularly true in the tourism services sector of the reservation economy. Conversely, an apparent innate respect for Native American cultural artifacts provides a basis for maintaining traditional values.

By distinguishing between the dominant (US) and traditional (Native American) value orientation of different activities, tourism development efforts on reservations can lessen the impacts of negative acculturation, and provide greater identity and self-respect for the traditional value system. This approach provides a flexible development option for both very traditionally oriented tribes and those with considerable economic development experience. Examples are presented from reservations in Arizona and New Mexico.

ANALYZING TRADE POLICIES FOR DEVELOPING NATIONS USING THE EXPANSION METHOD,

by James P. Levandovski, The Ohio State University, Columbus, Ohio 43210

The relationship between international trade and economic development is open to question. Nonetheless, the attempt by developing nations to spur economic grovth has focused largely upon trade policies and programs. Many different trade policies have been adopted, not all of them have been successful. Recommendations by economists regarding the appropriate trade policy are based upon either models of rational resource allocation or the observations of nations' experiences vith contrasting policies. In both cases, the particular conditions of a nation contemplating trade policies serve merely as a comparative framevork which is contraposed to the conditions in the model or of other nations. The expansion method provides the opportunity to analyze trade policies with regard for the varying circumstances of individual nations.

By vay of example, a simple econometric model of trade is expanded vith reference to the components of a "free trade" regime recommended by Krueger and Balassa. The terminal model is employed using data from 68 nations. The results suggest that, unlike the economists' portrayal, the benefits from a global move towards free trade are likely to be least favorable to underdeveloped nations and unequally distributed in any case.

EARLY GEOGRAPHIES OF NORTH AMERICA: AMERINDIANS, EXPLORERS AND GEOGRAPHY MAKERS

by G Malcolm Lewis, Department of Geography, University of Sheffield, Sheffield, S10 2TN, U K

Formal geographies of parts of North America were made during most of the 305-year interval between Columbus' arrival in the New World and the publication in 1797 by Jedidiah Morse - the Father of American Geography - of *The American Gazetteer ....* The contents, spatial arrangements and emphases of these geographies were fashioned not in the New World but in Europe, by men who received geographical information from North America via a transmission system over which they had little control and of which they had even less understanding. Not surprisingly, errors of commission, as well as of omission, were common. Contradictions were the norm. Confusions proliferated.

This paper describes a selection of early formal European geographies of North America and seeks to explain them by examining the:

i. Widespread use by European explorers of Amerindians as remote sensers of *terrae incognitae*;
ii. Consequences of differences in culture and cognitive styles between Amerindians and Europeans for the geographical information received via i (above);
iii. Distorting effects of the trans-Atlantic information - transmission system;
iv. Influence of pre-existing geographical lore and national aspirations on the transformation and incorporation of received information into formal geographies;
v. Complexities in the inter-European transmission of geographical information and formal geographies.

CHANGES IN THE EROSIONAL AND DEPOSITIONAL SYSTEM IN WESTERN RWANDA RESULTING FROM THE EXPANSION OF AGRICULTURE

by Laurence A. Lewis, Graduate School of Geography, Clark University, Worcester, Massachusetts 01610-1477.

The natural vegetation in the moist, high potential areas of western Rwanda is forest. Under these natural conditions, including areas of steep slopes, erosional rates generally are low (less than 2 T/ha/yr). Prior to colonization, 75% of Rwanda's forests were cleared. Since independence, tree planting, dominated by pines and eucalyptus has occurred. However, the overall pattern in vegetation cover, from tree cover to crop or pasture persists; only two forested areas, both susceptible to ongoing agricultural incursions remain. With this alteration in vegetation cover, both erosion and deposition rates have greatly increased throughout the region. In addition, evidence exists that rapid mass movements are also increasing. These changes in the hillslope/valley bottom system are decreasing the agricultural potential throughout the country's highland areas. Average soil loss values ranging from 500 to 800 T/ha/yr, measured on experimental plots in this area, give an indication of the magnitude of this problem on the steeper land as well as the major alteration of the geomorphic system as agricultural pressures increase.

THE DIFFUSION OF BITNET/CREN

by Lawrence T. Lewis, Western Illinois University, Macomb, Illinois 61455.

BITNET/CREN is a telecommunications network primarily linking colleges and universities, governmental agencies, and some commercial organizations with substantial research or education links to institutions of higher education. Member institutions pay an annual membership fee, but users have free access to the network. In 1989 BITNET merged with the much smaller CSNET (Computer Science Network), and voted to change its name to the Corporation for Research and Educational Networking (CREN).

The purpose of this paper is to trace the growth of BITNET/CREN from 1981 through 1989, and to assess its impact upon the exchange of academic information both on a national and an international scale. From its original three sites and three computers the network now links over 900 sites and 2600 computers throughout the world, and numerable sites in other networks are accessible via gateways. Through a series of maps and graphs, and within the framework of diffusion theory, I describe and analyze the spread of the network, including its connections with its sister networks, EARN and NetNorth, and other networks. The study finds that the network has the potential to greatly reduce the effect of distance upon academic interaction, but its impact is not uniform. Many academicians fail to take advantage of its service, either because of a lack of knowledge of the network or a reticence to be involved in using computers.

DEFORESTATION IN THE CORDILLERA OF NORTHERN LUZON, PHILIPPINES by Martin W. Lewis, The George Washington University, Washington D.C., 20052.

The southern reaches of the Cordillera of northern Luzon support two distinct forest communities, both of which are rapidly diminishing. The zone between 1000 and 2000 meters is dominated by *Pinus insularis*, a species highly valued for its lumber and resin production. On the higher slopes lies a cloud forest comprised of scrubby oaks useless for commercial purposes. This paper, based on archival and field research, compares historical and recent patterns of deforestation in these two communities.

Early in this century colonial officials "awarded" virtually all pine-growing lands to American-owned lumber companies serving the expanding mining industry. This ignited a conflict between local villagers and the state that still smoulders, wreaking much needless forest destruction. Since the presence of a single sapling could allow lumberers to arrogate a landholding, villagers often had little choice but to thwart regeneration. Although this has abated in recent years, the remaining pine stands are now falling to expanding vegetable farms and to local renegade loggers, often operating with the protection of local military officers.

The cloud forests, by contrast, were originally reserved by state officials for watershed protection. Since World War II, however, the cool ridge-top environment of the oak woodlands has proved perfect for burgeoning cabbage and potato plots, and local gardeners have cleared all accessible areas, even those previously set aside as national parks. Today new roads are pushing into the more remote remaining forests, partly for military purposes, and as the trees disappear both wet-season flooding and dry-season desiccation are intensifying.

HIV INFECTION AND TOURISM: IMPLICATIONS FOR PACIFIC ISLAND STATES, Nancy Davis Lewis, Department of Geography, University of Hawaii, Honolulu, HI 96822

HIV (Human Immunodeficiency Virus) and its end stage, AIDS, have demanded that the human community address a wide range of scientific, social, economic, and ethical issues. Because of the nature of HIV transmission, human population movement, including tourism, can be involved in its diffusion. HIV and the specter it casts have implications for tourism, particularly for countries in the less developed world heavily dependent on foreign exchange earnings from tourist activities. While HIV has established itself relatively late in the Asia-Pacific region, it now poses a significant threat. The epidemiology of HIV in Oceania and implications for tourism are explored within the cultural and socioeconomic context of the microstates of the Pacific region. The Pacific experience is compared with that in other parts of the developing world.

INDUSTRIAL AND WORKING-CLASS SUBURBANIZATION IN MONTREAL, 1890-1929 by R.D. Lewis, Department of Geography, McGill University, Burnside Hall, 805 Sherbrooke W., Montreal, Quebec H3A 2K6.

The formation of suburban industrial districts in the nineteenth century and the first part of the twentieth century has been a neglected aspect of the historical development of the North American city. The standard interpretation of suburban growth before World War II emphasizes the suburbanization of the middle class and the development of transportation. The assumptions underlying this interpretation are open to question, both empirically and theoretically. Recent research indicates that industrial and working-class suburbanization was underway from as early as the mid-nineteenth century.

The purpose of this paper is to present an examination of the suburbanization of industry and the working class in Montreal between 1890 and 1929. I will suggest that suburbanization, far from being just a middle-class phenomenon, was tied up with the growth of industry on the periphery of North American cities. The processes underlying this decentralization will be outlined. The degree of industrial suburbanization in Montreal will be shown through an examination of the city's water tax rolls. This will be followed by a brief outline of the relationship between the formation of peripheral industrial districts and working-class suburbanization.

PRESBYTERIANS IN AKRON, 1963-1989 by Richard T. Lewis, Geography Department, Kent State University, Kent, OH 44242.

The development of Presbyterian Churches in the Akron Metropolitan Area between 1963 and 1989 is examined. Changes in their location and in the numbers and characteristics of their membership are evaluated in comparison with changes in the size, characteristics, and spatial distribution of the metropolitan population during the same period. Decline in membership is seen in the context of the churches' limited response to the changing nature of the region.

FROM MOUNTAIN TO MARKET: NEW ZEALAND SHEEP IN TRANSITION, by Gordon R. Lewthwaite, California State University, Northridge, CA 91330.

The sheep industry, a basic component of the New Zealand economy, has been undergoing some significant reorientation and restructuring.

Not all is likely to change, for an enduring adaptation to New Zealand's varying environments has evolved. Initially, pastoralism was structured around the merino breed and the concomitant production of fine, long-stapled wool, but the advent of refrigerated shipping in 1882 accelerated incipient trends towards alternative breeds, along with regional and especially altitudinal differentiation. A three-tier system developed, with alpine high country maintaining a merino bias, intermediate hill country carrying store-sheep, and lowlands emphasizing prime or fat lamb. Thus New Zealand emerged as the leading exporter of both crossbred wool and lamb meat.

The industry, however, evolved in a marketing context which has now decisively changed. Wool exports, though commonly funneled through London, found varied buyers, but the British market, absorbing almost 90 percent of the lamb, shaped the overall pattern. Yet when the United Kingdom entered the European Community in 1973, New Zealand lamb (unlike butter) retained no transitional entry rights. Though access to North America was limited, market diversification intensified, with wool finding major (if fluctuating) sales in China and the Soviet Union, mutton in Japan, and lamb in the Persian Gulf: in some recent years, Iran purchased more than Britain. Sheep breeding, processing, and shipping have been modified, though not without some problematic readjustments.

A LONG WAY DOWN THE LINE: LONG DISTANCE COMMUTING FROM THE M4 CORRIDOR by Andrew Leyshon, Martin Doddy, and Nigel Thrift, Department of Geography, University of Dristol, Bristol, England B581SS.

The paper analyses the development of long distance commuting, a phenomena of growing demographic, economic, social, and political importance within the British space economy. Evidence from a series of extensive and intensive surveys of long distance commuters living in the western M4 corridor is presented. Long distance commuting is causing the spatial extension of particular housing and labour markets over space with important implications for socio-economic development within Britain's "southern economy."

From Direct to Indirect Monetary Control: Necessities and Conditions in China by Bin Li, Dept. of Geography, Syracuse University.

When planned economy undergone economic reform that is characterized by decentralization of administration and establishment of market mechanisms, traditional methods of direct control over the economy no longer as effective as before. Changed economic environment calls for new modes of control. In many circumstances, people tend to look for answers from the Western developed countries such as the United States and the United Kingdom. Thus the most talked-about model is the monetary control mechanism, specifically, the three policy tools-Open Market Operation, Discount Rate, and Reserve Requirement. Confronting with the cyclical inflations in recent years and the decreasing effectiveness of direct monetary control through administrative means, many economist urge that China should adopt indirect monetary control instruments to balance the aggregate demand and supply and maintain stable economic growth. Others suggest that the establishment of a new mode of control is subject to structural constraints in the economy. This paper first explains the needs for indirect monetary control in China with its economy transforming towards market operation by analyzing the decreasing effectiveness of administrative credit contraction. Then, some of the fundamental conditions for in direct monetary control, such as the independence of central bank and the conditions of money market are examined. It is concluded that the conditions for indirect control are not ripe yet in China.

DEFINING GEOGRAPHY FOR TEACHERS: Using the Five Themes To Answer Four Questions by M. Libbee, Department of Geography, Central Michigan University, Mt. Pleasant, MI. 48859

The five themes of place, location, region, human-environment relationships and movement have been the core of the common language that has developed as part of the last five year's work with geography education in the public schools. But the themes in themselves don't communicate what geography is, what teachers should teach, or what students should learn. This paper presents a framework for defining geography for teachers based on using the five themes to answer three questions: "What's the world like?" (Geography as the study of places), "How does the world work?" (Geographic cause or effect through people environment relationships and movement), "What in the world is going on here?" (Geography as a perspective on issues or events), and "What can I do about it?" (Making decisions in geographic context). Using the five themes to four questions framework helps teachers understand how to fit geography into existing social studies scope and sequence, helps students see geography as more than facts, and helps teachers identify learning outcomes and specific teacher activities. Content objectives, communication skills, and decision-making activities will be described for each of the questions, along with suggestions about the kinds of activities that can be used to help teach geography.

SPATIAL INEQUALITY IN THE GORBACHEV ERA by Ronald D. Liebowitz, Department of Geography, Middlebury College, Middlebury, Vermont, 05753,

This paper addresses contemporary issues of spatial inequality in the USSR. It will examine the concept of spatial equality under Soviet socialism, and compare the ideological/official views of equality with the geographical realities since the early 1970s. It will (1) weigh the eternal question of efficiency versus equality in development priorities and decisions; (2) with the aid of recently released data on Soviet society, identify regional "winners" and "losers" over the past two decades; (3) address the question of convergence or divergence in living conditions across regions; (4) project the impact that perestroyka and new economic strategies are likely to have on patterns of living standards in the Soviet Union; and (5) conclude whether the goals of perestroyka are likely to promote ethnic tensions due to their impact on regional variations in living standards?

* * * * *

GLOBAL ECOLOGICAL THOUGHT, RESOURCE MANAGEMENT, AND ENVIRONMENTAL ETHICS by J. Lier, Department of Geography and Environmental Studies, California State University, Hayward, California 94542.

This paper follows one presented at the last annual meeting of the APCG. It concerned the Gaia Hypothesis and some of its implications for geography and addressed specifically the questions of teleology and holism, emphasizing resource management, and it made comparisons with the ecosystem concept.

The Hypothesis remains a topic, especially concerning man's place in the ecological scheme it postulates. I shall very briefly summarize the previous presentation and then consider further the holistic approach to the study of relations between the biosphere and non-living spheres which the Hypothesis promotes, suggesting that geographers apply that approach more frequently to their research. In that connection, I shall advocate more interdisciplinary interaction and refer to my experience with the AAAS as AMS and AAG representative.

Regarding resource management, I shall examine the links between the Hypothesis and other ecological ideas and environmental ethics, building on work by Callicott, Leopold, and others.

Like the Hypothesis, the spatial framework will be mainly global. Inasmuch as they bear upon geography in general and resource use and management in particular, the concerns of environmental ethics will be placed in historical perspective within the Western Tradition.

This paper is based primarily on library research, seminar discussions, correspondence, and the results of the Chapman Conference of the American Geophysical Union at San Diego in 1988.

THE PREHISTORIC PEBBLE-MULCHED FIELDS OF THE GALISTEO ANASAZI: AN AGRICULTURAL ADAPTATION TO ENVIRONMENT by Dale Lightfoot, Dept.of Geography, and Frank Eddy, Dept.of Anthropology, Univ.of Colorado, Boulder,CO 80309

During the late 13th and early 14th centuries A.D., north central New Mexico was the site of a massive in-migration of Anasazi Pueblo people. Along with the population explosion came the need to greatly expand agricultural productivity. One of the strategies they devised at that time to expand arable land and increase agricultural yields was pebble-mulch farming.

The pebble-mulched fields (PMF) examined in this research were discovered around Pueblo San Marcos in the Galisteo Basin of north central New Mexico using CIR imagery acquired by NASA in 1987. After mapping and field checking in 1988, a detailed analysis of PMF was conducted in Summer 1989 for the purposes of determining: 1)PMF agricultural uses, 2)PMF siting considerations, 3)PMF construction, and 4)the effectiveness of PMF as an agricultural strategy.

Analyses of PMF are based on field derived soil samples, PMF maps, shallow excavations of PMF, gravel weights by volume, soil moisture, plant cover, biomass, and controlled PMF simulations.

It is concluded that pebble mulching is an effective agricultural adaptation to the constraints of a dryland environment. Pebble-mulching the fields will increase infiltration capacity and reduce evaporative water loss due to wind and sun. The upper few centimeters of a PMF will have from two to four times more moisture than an adjacent non-mulched soil, resulting in a two-fold increase in both plant cover and dryweight biomass. This technique could well serve to increase crop yields in drought-prone regions today where labor intensive, traditional agriculture is still practiced.

DUAL TOPONYMS OF HAMLETS IN CENTRAL ARKANSAS by James E. Lightfoot, University of Central Arkansas, Conway, Arkansas 72032

In many rural communities of Central Arkansas blacks and whites live in close proximity, yet maintain minimal social contact. As a result, several hamlets have developed dual toponyms, one used by blacks, one by whites. The communities of Salem and Holly Springs are known respectively by white residents as Whitten and Springfield. The contiguous black hamlets of Solomon Grove and Zion Grove are cumulatively referred to by nearby whites as the Batesville Mountain Community. Settlements that no longer exist, the Lolly Plantation and East Austin are known to blacks as the Little Place and Hickory Grove.

Interviews in or near these communities indicate the dual toponyms are for several reasons, including segregation of the races, and differing concepts of community purpose and structure. For whites the community name is assumed to cover an administrative unit, even if only to the level of recognition by the local postmaster, and may include blacks and whites. For blacks, the community is associated with a church, with most members related and this community includes all blacks in the settlement and non-resident church members. As long as current social conditions prevail, dual toponyms will remain.

THE DEVELOPMENT OF AGRICHEMICAL USE PRACTICES: IMPLICATIONS FOR THEORY AND POLICY by David R. Lighthall and Rebecca S. Roberts, Department of Geography, University of Iowa, Iowa City, Iowa 52242.

The intensely competitive nature of capitalist agricultural production has fueled the continual adoption of new production technologies and management strategies intended to increase productivity and short-term profits. From this view, non-point source contamination of groundwater and surface water from agricultural chemicals is the result of farming practices that have, and continue to be, essential elements of dominant farm management strategies in the post-war era. Such macro-level factors as energy policy, farm commodity programs, fiscal and monetary policies, and agricultural research agendas have served to intensify producer dependence on chemical inputs. The goal of ongoing research is to understand how micro-level factors, e.g. producer ideology, farm type, and household characteristics, have interacted with these external factors over time, resulting in the adoption and adaptation of chemical use practices at the farm level. The outcome is a production environment characterized by a set of obstacles and incentives to the adoption of low-input sustainable agriculture (LISA). Classification of farms with respect to these obstacles and incentives is the basis for an expanded theoretical analysis of capitalist agricultural development and environmental degradation. The results are relevant to the design of water protection policies that seek to eliminate incentives to intensive agricultural chemical use.

OPTIMAL CLASSIFICATION REVISITED by M. Lindberg, George Mason University, Fairfax, Virginia 22030.

Optimal classification procedures for choropleth maps have been part of the cartographer's repertoire for about twenty years. The Fisher algorithm, which was introduced to cartography more than a decade ago, is an efficient method for obtaining optimal classifications, and is the focus for the presentation.

A project examining modifications to the basic algorithm and approaches to its implementation will be briefly introduced. Two salient issues concerning the algorithm will be discussed in greater detail.

First, a primary constraint for the algorithm is processing time, which has led some researchers to disregard it and develop iterative procedures which cannot guarantee optimal solutions. Methods of obtaining fast implementations of the Fisher algorithm will be discussed. Second, the algorithm guarantees an optimal, but not necessarily unique, solution. A means of verifying unique solutions is presented, and the difficulties of obtaining all non-unique alternate solutions will be discussed.

THE IMPORTANCE OF THE FIGURE-GROUND RELATIONSHIP IN HUE SELECTION FOR BIPOLAR CHOROPLETH MAPS, by Richard E. Lindenberg and Audrey E. Clarke, Department of Geography, Kent State University, Kent, Ohio 44242-0001.

Research has shown that a bipolar choropleth map symbolized with two hues in value progression communicates more effectively than alternative symbolizations tested. A choropleth map conceptualized as a statistical surface represents high data values nearest to the map reader and low data values most distant when viewed plainmetrically. The nature of the data symbolized on bipolar choropleth maps may be linked to the perceptual associations of advancing and retreating hues with the figure-ground relationship. This paper reports the results of an experiment which suggests that advancing hues should be used to symbolize high data values and receding hues with low values on these maps.

GEOGRAPHY IN THE NEWS, '89-90 by Neal G. Lineback, Appalachian State University, Boone, NC 28607.

"Geography in the News" is a weekly newspaper column designed to provide geographic background to current events stories in newspapers and magazines. Continuing for the third year, the column includes more than 140 issues. Some of the most recent ones from 1989-90 are displayed in this poster session and samples provided.

The column is printed in several North Carolina newspapers regularly and has appeared in newspapers in Virginia and Maryland. Each issue is reprinted in an 8.5 X 11 inch format and is mailed weekly to subscribing schools and school systems in Alabama, California, Colorado, Illinois, and North Carolina. The column is used in Geographic Alliance workshops in several other states.

Designed to attract the reader's attention with an accurate, well-done map of the region to be discussed, the column attempts to bring current geographic perspectives from the academic world to the general public. The majority of the column concentrates on the physical and human geographic interrelationships that help the reader to understand the significance of "place" in current events.

The weekly readership of the column during the fall of 1989 was expected to be more than 100,000 persons across the country.

WASN'T THE FUTURE WONDERFUL? RESOURCES, ENVIRONMENT, AND THE EMERGING MYTH OF GLOBAL SUSTAINABLE DEVELOPMENT by Ronnie D. Lipschutz, Pacific Institute for Studies in Development, Environment, and Security, 1681 Shattuck Avenue, Berkeley, CA 94709.

According to Our Common Future, the report of the World Commission on Environment and Development, "Humanity has the ability to make development sustainable--to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs." The notion of global sustainable development has begun to develop a broad constituency, including actors as diverse as multinational oil companies and transnational environmental coalitions, presidents, prime ministers, and party chairmen. But is it an achievable goal?

Given existing political institutions and realities, both national and international, can it be accomplished without massive disruptions to existing patterns of behavior? If not, what are the implications of the required changes? This paper considers the broad implications of global sustainable development, its effects on political, economic, and social institutions, at both the national and international levels, and whether historical experience indicates that the concept can be more than just a slogan. The paper concludes that the problems of incompatible physical and geographic scales, the long time periods involved, and the differential distribution of resources and environmental problems across states will make it difficult for global sustainable development to be more than just another "myth" of the golden future.

WOMEN AND THE RURAL LABOUR MARKET: THE IMPACT OF RESTRUCTURING ON WOMEN'S EMPLOYMENT OPPORTUNITIES IN RURAL AREAS by Jo Little Department of Town and Country Planning, Bristol Polytechnic, Bristol, U.K.

The position of women in the local labour market has emerged recently as an important focus of geographical research in Britain and North America. Both the development of theoretical perspectives and the examination of empirical evidence have, however, concentrated almost exclusively on the urban sphere. The aim of this paper is to consider the particular position of women in relation to the rural labour market. Drawing on original evidence from a number of British case studies, the paper identifies the nature of women's employment opportunities in rural areas and examines the constraints surrounding their participation in waged work. Special attention is paid to the impact of structural changes taking place in the rural economy on the availability of waged work for women and on the conditions under which they are employed. The research presented in the paper provides a basis for the development of theoretical debate surrounding women's employment, locating contemporary discussion within a specifically 'rural' framework. It demonstrates the need for women's role in the local labour market to be analysed in the context of class and gender relations and argues that their participation in waged work can only be understood in relation to the complex interaction of capitalism and patriarchy.

LARGE-SCALE ECOLOGICAL APPLICATIONS OF PALEOECOLOGY by Kam-biu Liu, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, Louisiana 70803.

Biogeographers are primarily concerned with large-scale patterns of distribution and abundance of organisms and the processes that help to shape them. These patterns change through time in response to environmental changes that typically operate at time-scales from decades to millennia and beyond. Paleoecological studies provide a long-term perspective that is fundamental to the understanding of a number of biogeographic problems. One such problem concerns the postulated occurrence of rain forest refugia in the Amazon lowlands during arid phases of the Pleistocene--a hypothesis largely based on modern biogeographic distribution patterns but lacking paleoecological evidence to support it. Recent paleoecological data indicate that the full-glacial climate in the western Amazon Basin was cooler rather than drier than the present so that the postulated Napo Refuge in fact supported moist, montane forests of Andean affinities, and that high biological diversity in the Amazon is maintained by recurring hydraulic disturbances and climatic perturbations. Another example concerns large-scale climate-vegetation-soil interactions and dynamics of vegetation change. Paleoecological data from the transitional zone between boreal forest and temperate mixed forest in northern Ontario provide unequivocal evidence of Hypsithermal ecotonal movements, largely effected by the northward expansion of *Pinus strobus* populations on the Canadian Shield upland; whereas the same climatic change was marked by an increase in *Thuja occidentalis* in the Clay Belt lowlands due to a lowered regional water table. Individualistic species response to climatic changes is apparently conditioned and constrained by regional edaphic-physiographic controls.

Analysis of Long-term Cyclic Dynamics of Simulated Forest Stands. Zhi-jun Liu, Department of Geography, The University of Iowa, Iowa City, Iowa 52242.

In this study, I analyzed the long-term cyclic dynamics of simulated riparian forest stands under relatively stable but different environments. A forest succession simulation model, FORFLO, was used to generate a collection of time series for a selected variable, the number of trees on the simulated plots. Three environmental factors were considered: climate, soil, and river flow regime. Spectral analysis was performed on the time series from simulation. The dominant periods in spectral densities under different conditions were then analyzed using analysis of variance to reveal the influences of each of the three environmental factors on the cyclic behavior of the simulated forest stands. The mechanism of changes in cyclic dynamics revealed by spectral analysis was explored by examining the species sequences at different stages in simulation for each environmental condition. The most significant difference was found between cold and warm climates where a more diverse community dominated in the latter case.

SOME RECENT ANALYSES OF THE POLITICAL ECONOMY OF ENVIRONMENTAL CHANGE IN MEXICO : A COMMENTARY by Diana M. Liverman, Pennsylvania State University, University Park, PA 16802.

Although the major political economy studies of Mexican agricultural and economic development are widely cited in the U.S. and Canadian literature, the critical works on environmental issues in Mexico are less well-known. In fact, for many people, their only sources of information on the Mexican environment are the malthusian, apocalyptic accounts of urban pollution and overexploited resources in the popular literature.

This paper reviews some important recent studies, many of them published only in Spanish, on the political economy of environmental change in Mexico. I will discuss the nature the debate about the causes and consequences of environmental degradation in Mexico with reference to the work of authors such as Barkin, Mumme, Restrepo and Toledo. In identifying some of the theoretical perspectives and empirical evidence employed in such analyses, and I will also discuss the social construction of the debate about environmental conditions in Mexico and try to identify the relative roles of Mexican and foreign governments, journalists, ecoactivists, and academics.

Geography and Modernity: Past and Present by *David N. Livingstone,* The Queen's University of Belfast, Belfast, BT7 1NN, N. Ireland.

This paper focuses on the relationship geography sustained with 'pre-modern', traditional sources of knowledge during the period of the Scientific Revolution of the Sixteenth and Seventeenth Centuries as a means of clarifying its position in current debates about post-modernism. Even while confirming 'pre-modern' beliefs derived from natural magic, astrology and alchemy, geography helped challenge traditional dogma by its anti-authoritarian emphasis on experience. In due course geography, as with other sciences, came to adopt and to advance the new epistemological project of the nascent scientific culture, namely, classical foundationalism. Accordingly, geography was crucially implicated in the establishment of scientific rationality. This examination of geography's 'pre-modern' and 'modern' encounter with the methodological and cognitive content of scientific culture has important implications—both philosophical and historiographical—for the contemporary practice of geography in its 'post-modern' phase.

THE INFLUENCE OF BEDROCK ON PEATLAND COMMUNITY STRUCTURE: A BIOGEOGRAPHICAL COMPARISON OF TWO FENS IN WESTERN NEWFOUNDLAND by Andrea Lloyd, Department of Geography, Dartmouth College, Hanover, N.H. 03755, and Laura Conkey, Department of Geography, Dartmouth College, Hanover, N.H. 03755.

A distinct vegetative response to serpentine bedrock is well documented in communities based on mineral soils; this response is attributed to the high levels of heavy metals and low concentrations of plant macronutrients in serpentine bedrock. The purpose of this research is to determine the extent to which bedrock (particularly seprentine) influences vegetation dynamics in communities based on organic soils. We compare two fens in western Newfoundland: the first is located on an area of serpentine bedrock, the second, serving as a control, is located on gabbroic bedrock. Analysis of soil samples shows significant differences in chemistry between the two fens: ca/mg ratios in particular are significantly lower on the serpentine-based fen than on the control fen. Vegetation data from the sites are compared and differences in community dynamics quantified using multivariate analysis. These data show important differences between the two communities, including lower species diversity and fewer deciduous and herbaceous species on the serpentine fen. A significant proportion of the observed differences, however, seems to be due to an elevation difference rather than the difference in bedrock. Correlations of the vegetation data with the results of the soil analyses indicate that a significant amount of variation in the plant communities is attributable to the "serpentine effect", but, unlike in communities based on mineral soils, this effect does not appear to be the primary cause for observed differences in vegetation community dynamics.

PATTERNS ON COGNITIVE MAPS: ENCODING AND DECODING PROCESSES by Robert Lloyd, University of South Carolina, Columbia, South Carolina 29208, and Larry Skipper, University of South Carolina, Columbia, South Carolina 29208.

Maps can be thought of as storage devices that can transfer spatial information to map readers. Some transfer processes can be conceived of as serial processes where locations on maps are considered independent of other locations. Value estimation tasks are frequently done this way. Other processes can be conceived of as parallel processes where all locations on the map are considered simultaneously. Pattern recognition tasks are frequently done this way. Both types of processes could be used in a visual mode with a paper map or a memory mode with a cognitive map. This study is concerned with patterns on cognitive maps. We investigate how they are encoded into memory and how efficiently they can be decoded from memory.

We hypothesized that the relative success of map encoding and decoding processes, i.e., efficient in terms of time and accuracy, are a function of the characteristics of maps and map readers. Studies of experts, e.g., chess masters, have indicated they are significantly better than novices at pattern recognition tasks related to their expert knowledge. Another study has indicated that subjects who had used particular encoding strategies, e.g. imagery, were more successful at encoding information from maps. Other studies have revealed that choropleth maps constructed with different classification schemes vary in how efficiently they can be processed.

An experiment was conducted that had subjects encode choropleth maps of South America into memory and later reconstruct the patterns on the maps. Data were analyzed that related how efficiently the subjects encoded and decoded the information on the maps to the subjects'experience, the strategy they used, and the method of map construction.

ECONOMIC PLANNING AND RETAIL STRUCTURE IN METROPOLITAN LOS ANGELES by William J. Lloyd, California State University, Fullerton, California 92634.

Increasing competition among suburbs for sales tax revenue has influenced the spatial pattern of retailing in suburban Los Angeles. Retail sales intensity is analyzed for 115 Los Angeles suburbs for the years 1981 and 1988. In infill areas, increased spatial concentration of higher-order retailing has reinforced the pattern of multinucleation, especially in the automobile, home furnishings and apparel sectors. The only evidence of reduced disparities between have and have-not suburbs comes from lower-order goods such as food store sales. A very different pattern is observed in the outer suburbs, where economic growth of newer suburbs has reduced the dominance of older regional centers. The results of regression analysis indicate that differences in the rate of retail growth among individual suburbs are only weakly associated with changes in income and population, since the market area for many goods extends across municipal boundaries. Local economic planning efforts such as aggressive implementation of redevelopment in both inner and outer suburbs have contributed to increased levels of retail sales.

THE PATTERN OF URBAN SETTLEMENTS IN ZHUJIANG DELTA, SOUTH CHINA -- A SPATIAL ANALYSIS by C. P. Lo, Department of Geography, University of Georgia, Athens, Georgia 30602.

Under the open door policy, Zhujiang Delta of South China has experienced dramatic economic development accompanied by a rapid increase in the number of towns in individual counties in keeping with the Chinese urban development strategy of establishing a network of settlements based on large and medium-sized cities with links to small cities and market towns. The objective of this paper is to discover the characteristics of such a system using an analytical approach which involved an investigation into the town system's rank-size regularity and the spatial order of its distribution. A second-order analysis of the settlement pattern was carried out. Explanatory factors were also sought through the methods of factor analysis and cluster analysis using socio-economic variables by counties and cities extracted from statistics published by Guangdong Province. It was found that while there was a declining trend in urban primacy in the region, rank size regularity was distorted by excessive increase of towns in recent years. The spatial pattern of the towns showed a trend towards randomness suggesting a lack of correspondence between town density and the economic development level of the county. The factor analysis indicated the importance of urban collective, state-owned, and privately-owned enterprises as well as tertiary activities in determining the economic prosperity of a county. The counties of Nanhai, Shunde and Panyu which are geographically contagious to the major cities of Guangzhou, Foshan and Jiangmen in the delta were economically the most advanced region of the delta in 1987. The cluster analysis also revealed a highly differentiated spatial patterns of counties suggesting enhanced contrasts in economic performance among counties.

SPATIAL STRUCTURE, CONSUMER PREFERENCES AND SPATIAL INTERACTION by Lucia Lo, Department of Geography, York University, 4700 Keele Street, North York, Ontario, Canada M3J 1P3.

The notion of substitutability characterizes the impact of spatial structure and consumer preferences on spatial interaction. There are two types of substitutability: locational and economic.

With a CES utility function, this paper draws a link between substitutability and the distance parameter and argues that inadequate treatment of substitutability causes variations in the estimated parameters of conventional spatial interaction models. Recent advances in spatial interaction modelling, while addressing the variance issue, cannot separate spatial structure effects from economic preferences effects and their reliance on a single parameter makes it impossibleto identify specific complementarities or substitutabilities within sets of alternative destinations. The spatial translog demand model, based upon a flexible indirect utility function, is forwarded as an alternative to incorporate the impact of substitutability on spatial interaction.

MALAYSIA'S NEW ECONOMIC POLICY: ITS IMPACT ON CHINESE ENTREPRENEURSHIP by M. Lo, Department of International Business, Mankato State University, Mankato, MN 56001

This is a case study of the so-called "positive discrimination" policy of the federal government of Malaysia on Chinese entrepreneurship. The paper discusses the results of fifteen interviews conducted in July, 1989 in Kuching, Sarawak, East Malaysia.

The 1970-1990 New Economic Policy is designed and carried out to eradicate poverty as well as to increase the management and control of corporate ownership by Bumiputras (sons of the soil). Studies have shown that the close-to-two-decades of government have produced significant results in the economy and society. The purpose of this paper is to report on some initial findings on the impacts of Malaysia's affirmative action policy on the entrepreneurship of the Chinese business community in Sarawak, a geographical region of Malaysia that is rarely studied by most scholars. Fifteen (thirteen men and two women) chief executive officers of Chinese businesses in Kuching were interviewed in July, 1989 by this writer. The interviews were conducted in one or combination of two of the following languages/dialects: Mandarin, Hakka, Hokkien and English. The businesses vary in size of operation as measured by annual sales and number of employees. They include different types of operation: banking, commodity exporting, manufacturing, retail sales, and import-export businesses.

A general conclusion of the field study is that despite the "discrimination", entrepreneurs can survive and prosper in Sarawak.

BY CHOICE, CHANCE, OR DESIGN? SYSTEMATIC SPACING OF TOWNSITES ALONG SOUTH DAKOTA'S RAIL LINES: AN HISTORICAL ANALYSIS OF HYPOTHESES by Catherine M.Lockwood, University of Minnesota, Minneapolis, MN 55455.

An examination of historical maps discloses that railroads were a major catalyst in the settlement process of south Dakota. Likewise, railroads played a principle role in determining settlement location, specifically townsites. A noticeable characteristic of South Dakota's settlement pattern is the systematic spacing of towns at regular intervals along rail lines. Numerous theories have been advanced to explain this characteristic distributional phenomenon. Few scholars agree on the condition, or conditions, that gave rise to the systematic spacing of railroad platted settlements. Many plausible hypotheses have been suggested, but no definitive answer has yet emerged from among them. Various theories pertaining to the regular spacing of townsites along railroads of South Dakota are described, analyzed, and evaluated.

ENERGY POLICY AND RISK PERCEPTION-A SWEDISH CASE STUDY by R. Löfstedt, Clark University, Graduate School of Geography, 950 Main Street, Worcester, MA. 01610-1477.

This paper discusses the results of a study carried out in Sweden to assess the public perception of risks, benefits, and environmental impacts associated with major potential energy sources. The research project focuses on comparative analysis of two regions in Sweden to investigate reactions and changes in perceptions and attitudes of the public towards energy sources. Issues of major interest are: Has the awareness of the greenhouse effect influenced perceptions of nuclear power? Does the Swedish public approve current plans to phase out nuclear power by 2010 and to replace it with fossil fuels, large scale hydro, or other alternatives? Is the Swedish public aware of the large percentage of energy that Sweden must import every year? Will the large amounts of imported energy undermine the nation's security? Does the Swedish public believe that a phase out of nuclear power will increase its dependence on other nations for energy? The study incorporates the results of surveys, focus groups, and media analysis to obtain adequate information of the views of the public in the two areas.

The Impacts of Economic Reform in Sub-Saharan Africa by Bernard I. Logan, Department of Geography, University of Georgia.

In the past two decades, many sub-Saharan countries have experienced slow economic growth, and some of the worst cases amongst them have endured years of serious economic malaise. A large part of the dismal economic performance of these countries could be attributed to their debt obligations. In view of this fact, the focus of economic reform since the late 1970s has centered on means of alleviating the debt burden so that scarce foreign earnings could be released for other economic endeavors. Much of these efforts revolve around programs that are formulated and implemented under IMF and World Bank supervision. The study attempts to assess the merits of economic reform by comparing the performance of countries that are strong reform adopters against that of countries that are weak, or non-adopters.

CONTROLLING SERVICE AREA BOUNDARIES IN LOCATIONAL DECISION-MAKING by P. Lolonis and M.P. Armstrong, Department of Geography, The University of Iowa, Iowa City, Iowa 52242.

The primary goal of a Decision Support System (DSS) is to help decision-makers arrive at solutions to semi-structured problems. Such problems often involve consideration of multiple conflicting objectives which can not be specified or weighted clearly. To provide effective decision support for such problems, a DSS must perform a wide variety of functions. One such function that is frequently required in facility location problems is the capability to control the boundaries of service areas which must be delineated. This capability is desirable because of the existence of physical, socio-economic and political barriers that must not be crossed by service recipients. Current solution algorithms often yield unacceptable solutions because such boundary constraints are violated. This paper addresses the problem and describes a technique that enables existing optimization algorithms to be used for solving that problem. The goal is accomplished by artificially increasing transportation costs between all demand and candidate locations which lie on opposite sides of existing boundaries. The performance of the technique is demonstrated through a series of examples in a school districting problem in the State of Iowa.

FOREIGN DIRECT INVESTMENT IN PRODUCER SERVICES AND THE DEVELOPMENT OF THE SINGAPORE ECONOMY by John R. Lombard, Moran, Stahl & Boyer Inc., 353 Lexington Avenue, New York, NY 10017.

This paper is an empirical study of foreign-affiliated producer services in a newly industrialized country. The objective is to determine if foreign direct investment in producer services provides substantial benefits to a host economy. To assess the impact a comparison is made between U.S. direct investment in producer services and U.S. direct investments in manufacturing and the trade sector in Singapore.

First, the survey response of executives concerning their perceptions of the likely impact of their operations upon the Singapore economy is analyzed. Secondly, employment characteristics in terms of gender, wage, and occupational differences are examined. Thirdly, comparisons are made among the three sectors and their economic linkages in terms of destination of revenues and sources of inputs.

In the context of the Singapore economy evidence indicates that the benefits of foreign direct investment in producer services are more closely associated with the qualitative aspects of human-skills transfer and indirect linkage effects than with direct employment and linkage effects. This paper supports the United Nations Center for Transnational Corporations finding that foreign service affiliates are more free standing than are foreign manufacturing affiliates.

ASSESSING THE ECONOMIC IMPACTS OF CLIMATE WARMING ON THE CANADIAN ARCTIC by Steve Lonergan, University of Victoria, Victoria, B.C. V8W 2Y2, Ming-ko Woo, McMaster University, Hamilton, Ontario L8S 4K1 and Rick Difrancesco, McMaster University, Hamilton, Ontario L8S 4K1.

The primary objective of this study was to assess the impacts of climate change on the river and overland transportation system in the Mackenzie River Valley between Great Slave Lake and Norman Wells, N.W.T. by relating physical changes that might occur given a range of climate warming scenarios to changes in transportation infrastructure. These impacts would likely affect the movement and cost of goods and services in the region, with resulting direct and indirect economic effects. In turn, these changes would affect energy consumption, community development and other socio-economic variables. Specific case studies on social and economic impacts were undertaken for the communities of Norman Wells and Hay River.

The first phase of the project has been completed and concentrated on: 1) assessing the magnitude and frequency of extreme events and their impacts; 2) estimating the direct and indirect economic impacts that might accompany a changing climate in the region; 3) determining whether changes in transportation costs might be passed on to consumers; and 4) identifying any social impacts that also might occur. Each of these will be presented briefly.

The study concludes that extreme events are likely to have far greater impact than general increases in mean temperature, that the impacts on transportation will be most significant for pipelines and that technological changes are likely to mitigate most expected impacts.

CONFLICTING LAND-USE SCHEMES IN THE ECUADORIAN ORIENTE by Brian Long, Doctoral Candidate, Syracuse University, Syracuse, NY 13244.

The Ecuadorian Oriente is a frontier zone of colonization. Transportation improvements, potential mineral wealth, and population pressure in other parts of the country have combined to open Ecuador's Amazon basin. Difficulties associated with Ecuador's flagging economy have spurred interest in this region and conflicting development schemes.

Following the devastating earthquake of March 1987, 150 displaced families aided by the Pacto Church established a new settlement in the Oriente at Sumaco, Napo province. After a year of struggle and privation, the Government declared the Sumaco region a wilderness preserve in which development is prohibited. Rumors circulated that oil had been discovered and that the settlers would be evicted in favor of petroleum development. Further, large cattle ranches located nearby expressed interest in expanding their operations into the Sumaco region.

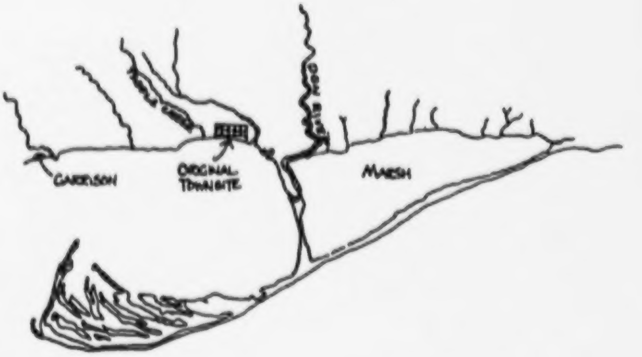
Increasingly, the Ecuadorian Oriente and frontier zones around the world are being transformed by development pressure. Sumaco provides an outstanding case in which these pressures are clearly evidenced. An examination of the procedures through which these conflicting land-use schemes interact and compete highlights the impact of global and regional development trends on a specific region and illustrates the difficulties inherent in "Sharing the Global Village".

CONDUCTING CO-OPERATIVE IMMIGRATION RESEARCH: THE UNITED STATES - CANADA CASE BY J. Long, U.S. Bureau of the Census, Washington, D.C. 20233 and E. Pryor, Statistics Canada, Ottawa, Canada K1A 0T6

Historically, the flow of immigrants between the United States and Canada is one of the more significant on a world scale. An estimated 4.7 million people formally migrated between the United States and Canada from 1910 and 1986. The balance of this migration has been to the United States by a ratio of 2:1. Relying on the stock data available from the 1980 Census of the United States and the 1981 Census of Canada, a study was undertaken by the two national statistical agencies to compare the characteristics of immigrants between the two countries. This presentation reviews the series of issues intrinsic to conducting such a joint study including problems of data comparability; approaches to improving data comparisons; and arriving at interpretations from an international perspective. Also some results, expected and unexpected, will be briefly noted. Lastly, the inevitable question of what has been learned from this joint effort relevant to future cross-national immigration research is addressed.

ECONOMIC CHANGE AND THE EVOLUTION OF COUNTERURBANIZATION IN THE UNITED STATES, by Larry Long and Diana DeAre, U.S. Bureau of the Census, Washington, D.C. 20233.

Many explanations were offered for the development of counterurbanization in the 1970s, but few explanations have been offered for the return to faster population growth in the metropolitan than nonmetropolitan sector in the 1980s. For the United States this paper tests economic interpretations of these changed patterns of population growth with data from County Business Patterns, a Census Bureau program that provides annual data at the county level on the number of establishments (classified by industry), their payrolls, and their employees. The paper tracks annual change in these variables from 1975 through 1986 and annual change in population at the county level to gain new insight into the timing of economic and demographic change in metropolitan and nonmetropolitan settings.



URBAN MORPHOLOGIES IN NEARLY-THREE DIMENSIONS: EXTENSIONS TO DIFFUSION-LIMITED AGGREGATION by Michael Batty and Paul Longley, Department of Town Planning, University of Wales, Cardiff, P.O. Box 906, Cardiff CF1 3YN, United Kingdom.

Diffusion-limited aggregation (DLA) in two-dimensional space leads to the growth of tree-like forms which bear a strong visual similarity to radially-concentric cities. This analogue model may be extended to the third dimension in order to represent city growth in the vertical as well as the horizontal plane. In this paper, we model city growth in a slice of three dimensions, the width of the slice being related to the attainable vertical depth of the city. We begin with the third dimension restricted to just two lattice points but then increase it to four, ten and finally 50 storeys consistent with changes in building technology over the last 500 years.

From these simulations, we argue that the extent to which a city fills the available space (as measured by the fractal dimension) depends upon growth which occurs in more than two but never entirely three dimensions. Pure DLA models generate a fractal dimension of 1.71 in the plane: in out 'nearly three-dimensional' simulations, we show that cities can be grown which still have fractal dimensions of less than two but greater than 1.71. We conclude by speculating whether it is this third constrained dimension which governs urban morphology, or whether it is likely to be some feature of aggregation which is not captured by the process of DLA.

MicroCAM - *Micro*Computer Automated *Mapping* by Scott A. Loomer, MicroConsultants, P.O. Box 3455, Mililani, Hawaii 96789.

MicroCAM is a microcomputer-based program designed for use in the instruction of computer-assisted cartography. With MicroCAM, a student can experiment with more than twenty map projections and a wide variety of mapping parameters, all on an easily accessible microcomputer. It is an ideal tool for the cartography instructor, allowing for use both in a laboratory setting and in evaluation of student work.

Modeled on the Cartographic Automatic Mapping (CAM) program, MicroCAM retains the basic features of CAM, a mainframe-hosted program, but adapts them for use on microcomputers. (The CAM program and its associated databases of the world were developed by the Central Intelligence Agency). Both MicroCAM and CAM are designed to generate reference maps of any region of the world to a user's specifications.

Unlike the CAM program, which is batch-mode oriented and provides output only to pen plotters, MicroCAM is interactive and its results are quickly displayed in high resolution graphics on the microcomputer's display. To enable the instructor or student to evaluate work completed, MicroCAM features printed output on a variety of dot-matrix and laser printers. MicroCAM maps can be output in formats compatible with popular computer-aided drafting programs.

MicroCAM offers the computer-assisted cartography student and instructor the opportunity to create maps with the flexibility and ease of use inherent in an interactive microcomputer system.

TRANSFERRING LIVESTOCK GUARDING DOGS FROM EUROPE TO THE UNITED STATES by Jay Lorenz, Dept. Geosciences, Oregon State University, Corvallis, OR 97331

Predation of sheep and goats is a problem in both the U.S. and Europe. European shepherds have used livestock guarding dogs to reduce predation for centuries. Formal programs introducing guarding dogs to American sheep and goat producers began in the late 1970's. The purpose of this study was to evaluate the performance of livestock guarding dogs in a variety of locations across the U.S.

Husbandry practices, cultural traditions and predator densities vary across the U.S. and from Europe. In the U.S. sheep and goat raising occurs in numerous ecoregions, in flocks ranging from several to over 1000, and in rural and urban fringe environments. The problem was whether the time honored tradition could be universally acceptable on a new continent.

Survivorship of dogs was compared by ecoregion, rural population density, flock size, breed, and sex. Survivorship was a reflection of dog behavior. Environmental parameters were indicators of husbandry practices. Statistically significant differences were found in the effects of flock size and breed. However, differtial survivorship according to flock size was not significant when sheep-years of protection was considered.

Adoption of the practice of using guarding dogs grew steadily during the first decade. The majority of ranchers that tried guarding dogs continued the practice despite failures of individual dogs.

Livestock guarding dogs appear to work well in all regions of the U.S. Patterns of adoption reinforce this conclusion.

HISPANIC IMAGES OF JERSEY CITY by Dale R. Lott

Department of Geoscience/Geography Department
Jersey City State College, Jersey City, NJ 07305

Jersey City, New Jersey has become the home of a large number of hispanics from Cuba and Puerto Rico as well as from South America and Central America over the past thirty years. Many have settled in the northern "Heights" section of the city. The focus of this paper is the determination of their sense of the Heights as a neighborhood and their cognitive imagery of the greater urban area of Jersey City. Male and female hispanics of various ages, national origins, and educational backgrounds were interviewed in their own homes. Sketch map drawing and interviewing techniques were patterned after the scholarship of Kevin Lynch and Mebane/Francescato.

Hispanic responses showed great informational gaps especially of the southern section of the city. Scanty information references were made to the Jersey City commercial center or to the Heights as a physical region. There is an endorsement of the city as an acceptable place to live for personal and family reasons.

CURRENT AND POTENTIAL MANAGEMENT PATTERNS IN NEW ZEALAND NATURAL LANDSCAPE RESERVES by Cheryl W. Lougeay, State University of New York College at Geneseo, Geneseo, New York, 14454.

This study deals with the current and potentially changing patterns of land-use management in New Zealand's natural environments. New Zealand is renowned for its commitment to preservation of representative ecological landscapes. Nearly 10% of the land area is devoted to twelve designated national parks, as compared to 3.6% of the United States, 3% of Australia, and .16% of Finland. There are also three maritime parks, the potential for protecting as much as 10% of the coastline in marine reserves to complement the national parks, over fifteen hundred other reserved areas, and a national system of walking tracks. Strict conservation policies have been incorporated into government legislation, but the current conservation strategies have been primarily successful due to policy input from nongovernmental citizen organizations. It is hypothesized that this renowned citizen involvement in land use decision-making will become less effective and natural area management more fragmented with changing socio-economic factors. As the 1989 government reorganization progresses, the economy in New Zealand faces inflation pressures, tourism increases, and the Maori land claims lead to the necessity of co-management practices, the environmental integrity of the reserved lands may be compromised and the commitment to long-term conservation goals reduced.

FACTORS AFFECTING PATTERNS OF PERSONAL ASSAULT by Ray Lougeay, Katina Pappas, and Jon Bathgate, Department of Geography, State University of New York College at Geneseo, Geneseo, New York 14454.

Spatial patterns of personal assault and attempted assault, including rape, date-rape, muggings, and acts of battery, were mapped over a series of years for the area of a small college (approximately 5000 students) located in a rural village (total 1980 census population numbered 3808, plus 2938 "institutional") in upstate New York. The results of a survey to determine spatial patterns of perceived assault danger, and maps of radiometrically measured levels of nighttime illumination, were compared with actual assault patterns employing automated computer-based techniques. It was hypothesized that both perceived and actual patterns of assault would be positively correlated spatially with nighttime illumination. This hypothesis was shown to be only partially valid. Other factors, such as spatial density of pedestrian traffic and the spatial density of locations for attackers to hide, were found to be important in understanding the actual mapped pattern of assault frequency.

MAYA SURVIVAL IN IXIL COUNTRY, GUATEMALA, by W.G. Lovell, Queen's University, Kingston, Ontario, Canada, K7L 3N6.

Maya Indians in Ixil country have suffered dreadfully as a result of the counterinsurgency campaign unleashed throughout Guatemala during the past decade. A haven in the mid-1970s for left-wing groups waging armed struggle against corrupt, right-wing regimes, Ixil country in the early 1980s became the scene of some of the most violent clashes between guerrilla and government forces. It also became, in the wake of the latter's "victory", the scene of a systematic "development pole" initiative in which considerations of control and security led the Guatemalan military to dismantle traditional dispersed forms of settlement in favour of more nucleated ones. Thus the three principal Ixil communities of Nebaj, Chajul, and San Juan Cotzal are now surrounded by more than thirty "model villages" in varying degrees of social and economic dependence, self-sustaining development being made impossible by ongoing political instability. On the basis of recent fieldwork, an evaluation is made of the present living conditions and potential future options of an indigenous population caught in the cross-fire between two outside factions insensitive to its needs.

TRAGEDIES ON MT. GILBOA by Jonathan J. Lu, University of Northern Iowa, Cedar Falls, Iowa 50614-0406.

"O mountains of Gilboa
May you have neither dew nor rain
Nor fields that yield offerings of grain
For there the shield of the mighty was defiled
The shield of Saul--no longer rubbed with oil"
--II Samuel 1:21 (NIV)--

Gilboa, whose name means "Bubbling fountain," is one of the mountains that bind the famous valley-plain of Esdraelon. The Esdraelon, well-watered with a mild climate, is known as "The Rich Valley." The mountains of Gilboa, stand at the southeastern border of the plain, guard the entrance to the Esdraelon together with Mt. More, are indeed beautiful and spectacular.

Yet in his song of lament, King David cursed the mountains of Gilboa. Why? A tragedy of tragedies has just occurred on that mountain. This paper, exploring that tragic event from a geographic perspective, adds another dimension to the understanding of that biblical record.

LAND USE DYNAMICS IN RURAL URBAN FRINGE AREAS by Peter Lucas, Institute of Geographical Research, University of Utrecht, Postbox 80.115, 3508 TC Utrecht, The Netherlands.

Rural urban fringe areas are characterized by a mixed and heterogenous land use pattern: rural functions and urban functions are intertwined.
The growing influence of urban-associated functions however results in a highly dynamic land use pattern in the city's countryside.
This paper focusses upon the land use and the dynamics of land use in the rural urban fringe area of Utrecht, the Netherlands (250.000 inhabitants). Data was collected by means of interviews among all space users in the reseach area (900 adresses: farms, firms and residents). The aim of the questionaire was to clarify the present land use (esp. the build environment) and changes in the land use during the period 1970-1989. Also problems and tensions resulting from these changes are examined.
In order to analyse the heterogenity and spatial arrangement of land use types a GIS is used.
The research should give insight into the dynamics of land use and the possible problems related to land use changes in rural fringe areas.

A LANDSCAPE OF DESPAIR: COMMENTS ON THE GEOGRAPHY OF THE CONTEMPORARY AFGHAN REFUGEE EXPERIENCE by Lubomyr Y. Luciuk, Department of Geography, Queen's University, Kingston, Ontario, Canada, K7L 3N6.

Geographers have paid slight attention to the dynamics of the refugee experience in the twentieth century. This paper, based on official census data, the conclusions of an earlier study dealing with the post-Second World War Ukrainian refugee experience, and preliminary field observations in the North West Frontier Province of Pakistan, maps out the distribution of the Afghan refugee communities and takes into account the belief systems and perceptual processes that act within this population to create, sustain and modify its spatial patterns. It also considers how the cultural and attitudinal characteristics of these displaced persons have been affected as a result of their refugee experience, particularly that taking place within the enclavic space of the refugee camps. It concludes by suggesting why Afghanistan will remain a deeply troubled region of the world, and, as such, a source area of refugees well into the forseeable future.

PROBLEMS IN PALEOENVIRONMENTAL RECONSTRUCTION USING TREE-RING SERIES by B. H. Luckman, Department of Geography, University of Western Ontario, London, Ontario N6A 5C2.

Tree rings provide natural archives with annual resolution that contain a variety of paleoenvironmental information and offer the best possibility over most of North America for proxy data for the past 200-500 years. Dendrogeomorphic techniques also can provide precise dating and frequency estimates for a variety of geomorphic/climatic events. Although there has been extensive research in the American west, little dendrochronological work has been done in Canada, however, there is excellent potential for long records (>500 yr) from treeline sites in the Cordillera. Initially one has to find and develop tree-ring series from long-lived species to identify possible climatic signals. These records must be calibrated with existing climate data (which are sparsely distributed in both elevation, space and time) to develop appropriate transfer functions using ring width, density or isotopic data. The approach may be to reconstruct time series at a site (where sites are limited) or to reconstruct spatial patterns for individual years or time periods over a network of sites. A number of these problems will be reviewed based on results from the Canadian Rockies.

PROSPECTS OF ASIAN ECONOMIC TIES WITH CHINA AFTER THE BEIJING JUNE 4 INCIDENT by Chiu-ming LUK, Department of Geography, Hong Kong Baptist College, Waterloo Road, HONG KONG.

This paper examines the consequences of Beijing's June 4 Incident of 1989 within the context of Asian economic ties with China. The situation is contrasted from developments during the decade 1979-1988. Geopolitical frameworks on different trade blocs among Asian countries are first presented. Then, impact of the Incident is discussed with respect to Taiwan and Hong Kong, two "Little Dragons" in Asia. The larger Asian context is then examined with respect to Japan, South Korea, Singapore, and other ASEAN countries. Careful inspections on governmental reactions, responses and actions by businessmen, etc, reveal similarities among Asian countries. They are, in general, mild reactions when compared to violent condemnations by western countries on Beijing's crackdown on pro-democracy movement. It seems that Asian countries are largely guided by realism which will lead to eventual resumption of normal economic ties with Beijing, given China follows a more restraint policy towards its dissidents. China's economic difficulties necessitate re-cultivation of ties with foreign powers. Its Asian neighbors are its first targets. So, stoppage of economic ties with China is a temporary phenomenon to be shelved once economic reality outweighs other concerns.

SOIL ERODIBILITY, SURFACE CRUSTING AND LAND MANAGEMENT IN THE LOESS PLATEAU REGION, NORTH CHINA by Shiu-hung Luk, Department of Geography and Institute for Environmental Studies, University of Toronto, Erindale Campus, Mississauga, Ontario, Canada M5S 1A1

During 1986-88, field research was conducted in the Wangjiagou Experimental Basin, Lishi, China. The objectives of the field monitoring and experimentation were to evaluate the effect of land use on soil erodibility; and to determine the role of surface crusting and sealing in soil erosion, especially in relation to rill initiation. Through field monitoring of soil conditions at six sites over a 15 month period, it was found that soil resistance to erosion was significantly lower at the cultivated than at the uncultivated sites. Plowing which typically occurs before the onset of the rainy season futher reduces soil resistance. Field experiments show that crusting of surface soil formed by raindrop impact normally increases soil resistance to rainsplash and rainwash erosion but the effect varies with slope gradient and land use. However, the presence of surface crusting significantly increased runoff rate. As a result, rill development was enhanced. At present, the popular agricultural practice in the Loess Plateau is to manually disrupt the surface crusts as frequently as possible. Due to this practice, although infiltration may be enhanced, sediment availability is increased. On the other hand, undisrupted crusts may lead to excessive rilling. Hence, a strategy of crust management based on (a) partial disruption; and (b) improved soil organic content is recommended.

Macintosh based Image Processing for Shuttle Earth-viewing Photography by Kamlesh Lulla and Michael Helfert, NASA/Johnson Space Center, Houston, Texas 77058.

NASA Astronauts have acquired over 88000+ Earthviewing photos since the manned program was initiated in early sixties. This unique database of Earth's ecosystems has remained underutilized for a long time. Efforts are underway to apply image processing technology to this national resource to demonstrate its value and utility to scientists trying to understand global change in Earth's environmental systems.

An innovative image processing system has been assembled using the shelf scanning, digitizing and processing components that are driven by Macintosh II system with 60 Mb internal and 180 Mb external hard disk. Other output peripherals and input devices such as optical disk drive,WORM drive,CD-ROM, Laser printer and film printer are integrated to this assembly.

Ecological applications of the Shuttle Earth-viewing photo database are demonstrated and discussed in this presentation.

THE USE OF SPOT AND LANDSAT TO SUBSTANTIATE A PROPOSED REGROUPING OF THE NATIONAL WETLANDS INVENTORY by Donald E. Luman, Department of Geography, Northern Illinois University, De Kalb 60115-2854.

The Illinois Department of Energy and Natural Resources recently completed a statewide inventory of Illinois' remaining wetlands through a cooperative agreement with the U.S. Fish & Wildlife Service (USF&WS). The result is both conventional maps and digital cartographic data for nearly 1100 quadrangles, which have been archived on the state's ARC/INFO system. The experiences of users of the National Wetland Inventory data base (NWI) have shown the Cowardin-based USF&WS classification scheme is too complex for the diversity of applications and variety of agencies requiring wetland information. In Illinois, over 500 specific types of wetland and deepwater habitat are recognized. A proposed Illinois Grouping Code (IGC) scheme reduces the potential number of wetland types to only 38 categories.

In order to determine if such a logical regrouping also constitutes a functional association of wetland types, field analysis of 358 wetland sites was conducted to first validate the USF&WS classification and to also evaluate the IGC scheme. Slightly over one-third of the sites were found to have either a different or changed USF&WS classification below the class level since the NWI was conducted. This resulted in only a 15 percent change within the IGC scheme. It was determined that SPOT Panchromatic imagery can be utilized to accurately define the prevailing water regime, and classification of SPOT MSS and Landsat TM data support the use of the IGC scheme. The combined use of SPOT Pan and MSS appears to be especially effective for small, palustrine wetlands.

RESIDENTIAL RENOVATION AND NEIGHBOURHOOD CHANGE IN TORONTO, 1972-1988 by Martin Luymes, University of Toronto, Toronto, Ontario M5S 1A1.

Cities in Canada and the United States have witnessed, since the early 1970s, a general increase in private housing reinvestment through renovation of the existing housing stock. Attention has accordingly been given in the literature towards explaining these phenomena, particularly the more popularized forms of inner city change ('gentrification'). Still, remarkably little is understood about how the 'supply' of housing produced by the existing stock changes over time or how and why these changes vary spatially within cities.

The paper reports on some of the results of an historical account of renovation investment in Toronto through the 1970s and 1980s. Analysis of micro-scale data sources (building permits, housing sales, assessment records and the City of Toronto's Housing Occupancy Analysis System) reveals a rather more complex pattern than is suggested by aggregate statistics. Reinvestment activity is broken down into a variety of different forms and related to housing market activity, neighbourhood change and the local political context. The links between alteration of the existing housing stock and the historical geography of social change in Toronto are also explored.

SCHOOL DEMOGRAPHY AND THE GIS by Richard Lycan, Portland State University, Portland, Oregon 97207-0751.

Considering the importance of public schools as a social institution and the place of school issues in local politics it is surprising that geographers have not directed more attention to issues such as school location or the delineation of attendance area boundaries. Demographic changes in urban neighborhoods during the last decade have had major locational impacts on school attendance patterns. For example the, movement of the "baby boom" generation from parental homes in the late 70's and early 80's resulted in the rejuvenation of some neighborhoods, but this phenomena was often ephemeral as these families moved to more suburban locations later in the 80's. These recent demographic changes often have resulted in sudden changes in school enrollment patterns that have caught school planners off guard. The usual forecasting models that are based on recently observed migration and fertility patterns have not been very accurate, especially as the time since the last decennial census increases.

This paper describes the use of GIS techniques to develop up to date information on school demography. Address matching techniques were used with digital school attendance records to pin- map students and their characteristics. Student locations were related to zoning and land use information to link enrollment forecasts to planning data and forecasts. Data developed using these techniques provided a largely independent check for the traditional cohort and grade progression models. In addition it helped provide the basis for dialogue between urban planners and school officials.

THE INTRAURBAN IMPLICATIONS OF ECONOMIC RESTRUCTURING by Donald Lyons, Department of Geography, University of Colorado at Boulder, Boulder, Colorado, 80309.

Recent years have seen a number of major changes in large U.S. metropolitan areas. Specifically, the rise of various high-technology and service/information oriented industries, the decline of the traditional manufacturing sectors, and the erosion of the power of labor. Notions of concentrated decentralization have been used to describe the spatial dimensions of these changes. In general, these changes have been related to the concept of economic restructuring. While a number of competing, but similar, theoretical frameworks have been outlined in the literature few detailed attempts have been made to relate these, essentially macro-level theories, to the intraurban level. Yet, the consequences of economic restructuring are experienced most acutely at the intraurban level and may lead to significant intraurban conflict with important implications for our understanding of the geography of the late 20th century city. This paper, by focusing on one particular city (Denver, Colorado), attempts to highlight the spatial implications and political conflicts which result from economic restructuring and how these conflicts are worked out at an intraurban level.

WORLD IMAGES AND CONFLICT RESOLUTION IN THE GLOBAL VILLAGE by Charles L. MacCabe, University of Arizona, Tucson, AZ 85721.

It is unlikely that we will ever peacefully share the global village if we do not know our way around it. Geographic knowledge forms the basis for retaining and interpreting information about the world. Recent history in the United States and elsewhere has demonstrated the consequences of policy decisions made on the basis of inaccurate or incomplete world images. Yet, documentary evidence in the form of world sketch maps suggests that geographic education has done a poor job of ensuring that the products of secondary schools possess a good foundation for informed decisions on world issues. World images, like the world economy, are still dominated by the developed nations. Ethnocentric and Eurocentric world images serve to undermine the potential for resolution of world political, social, and environmental problems.

Educators have the means to counteract society's tendency to instill parochial images. World sketch map data show that foreign language study and foreign travel lead to more complete world images. Geography must assume a central place in school curricula as a separate subject. Developing nations, which are apparently neglected in the media and in geography curricula both within and outside the core, need to receive greater attention.

PALEOECOLOGICAL EVIDENCE FOR ASYNCHRONOUS CHANGES IN THE MEAN SUMMER POSITION OF THE ARCTIC FRONT OVER WESTERN AND CENTRAL CANADA by G.M. MacDonald, Geography, McMaster University, Hamilton, Ontario, L8S 4K1, and K.A. Moser, Geology, Queen's University, Kingston, Ontario, K7L 3N6.

It has long been recognized that the geographic location of the northern treeline of western and central Canada coincides with the mean July position of the Arctic Front. Paleoecological reconstructions of treeline provide the potential of linking past changes in the latitudinal and seasonal distribution of solar radiation with changes in high-latitude circulation patterns. Changes in the distribution of solar radiation are controlled by variations in the orbital geometry of the Earth. Changes in circulation patterns reflect radiation input, boundary conditions, and atmospheric dynamics. Fossil pollen and plant macrofossil records from northwestern Canada clearly indicate that the maximum northward extension of the treeline occurred in the early-Holocene and treeline had retreated to its modern position by 5500 yr B.P. Recently acquired fossil pollen and geochemical records from central Canada indicate that the maximum northward extension of treeline in this region occurred between 5000 yr B.P. and 3500 yr B.P. The asynchronous behavior of treeline extension in northwestern and central Canada cannot be explained by variations in radiation input. The delay in treeline advance in central Canada may have been caused by boundary conditions related to the remnants of the Laurentide Ice-Sheet and subsequent westward extension of Hudson's Bay in the early- to mid-Holocene and/or the inherent dynamics of the long-wave arc that defines the summer position of the Arctic Front in western and central Canada.

EFFICIENCY AND EFFECTIVENESS OF MAP LEARNING STRATEGIES USING SEGMENTATION by Alan M. MacEachren, Department of Geography, 302 Walker, Penn State University, University Park, PA 16802.

Substantial effort over the past quarter century has been devoted to improving map effectiveness. We now have a grasp of many psychophysical variables in map symbolization and design. Limited attention, however, has been given to how spatial knowledge is acquired from maps or how this acquisition process might compare to learning information directly from the environment. When a person studies a map, learning strategies are likely to influence both the ease of learning and the manner in which information is organized in and retrieved from memory. The specific goal of the present paper is to consider the applicability of environmental learning theories based on segmentation to learning of urban environments from interactive maps. Three learning strategies that segment maps differently are compared to a control case. The three strategies put emphasis on routes, landmarks, and regions as the fundamental building blocks of a framework for organizing position knowledge.

An interactive computer map presentation system was developed. This system allowed a complete map or various parts of the map to be presented, posed questions to subjects, and recorded subject responses and the time it took for those responses to be made. Analysis focuses on two factors: learning difficulty and position knowledge. The map segmentation strategy emphasizing routes exhibited significant advantages over the other methods, particularly in ease of learning.

DEMONSTRATIONS AS A POLICY INSTRUMENT WITH ENERGY TECHNOLOGY EXAMPLES by Susan M. Macey, Southwest Texas State University, San Marcos, TX 78666, and Marilyn A. Brown, Oak Ridge National Laboratory, Oak Ridge, TN 37831.

Although relatively little research has been focused on the role of demonstrations in the diffusion of nonagricultural innovations, evidence from several fields indicates that demonstrations can be an effective tool in the diffusion of information, and the promotion of new technologies and practices. This paper provides a review of knowledge to date on the nature and scope of demonstration projects, using energy technology examples. It outlines the characteristics of demonstration projects, their goals, methods employed, and the means by which they are evaluated. Implementation strategies employed in several energy demonstration projects are examined.

On the basis of the demonstrations function, two types of policy applications are distinguished: experimental demonstrations, and exemplary demonstrations. These two types are put into the context of the technological innovation process, and their potential role at different stages in that process are defined. The paper also explores how the effectiveness of demonstration projects can be maximized in terms of their information, application, and diffusion success. Finally, conclusions concerning when and where they can be most useful are proposed.

APPLICATION AND EVALUATION OF MAP GENERALIZATION TECHNIQUES by William A. Mackaness, Department of Computer and Information Science, University of Otago, Dunedin, New Zealand.

There are about ten techniques that are invariable used when generalizing a map. The factors governing their applicability are many. To date, generalization techniques have been researched in isolation of one another, and appraised using mathematical techniques. It is becoming increasingly apparent that the combination and degree of application of these techniques are interdependent of one another, and need to reflect the geographical character of features, the map type, user knowledge, and also encompass the objectives of aesthetics.

This paper attempts to summarize these qualitative attributes using an "attribute-rose diagram". Attributes typically used to describe a map are represented by spokes. The distance up the spoke is proportional to the strength with which that adjective describes the map. The problem thus becomes one of pattern recognition, namely associating generalization techniques according to the shape of the rose. This approach is holistic, and for use in establishing the combination and degree of application of generalization techniques and as a way of evaluating the success of the graphic.

A FULL SCALE FIELD EXPERIMENT ON THE GROWTH OF PERMAFROST, WESTERN ARCTIC COAST, CANADA by J. Ross Mackay, University of British Columbia, Vancouver, B.C. V6T 1W5

On 13 August 1978 a large lake (300 m by 600 m) located 60 km west of Tuktoyaktuk, N.W.T. was artificially drained in a full scale field experiment to grow permafrost. Before lake drainage, a 30 m deep unfrozen basin underlay the lake. The surrounding permafrost was about 600 m deep and tens of thousands of years old. The purpose of this paper is to discuss some aspects of permafrost growth, ab initio, from 1978 to 1989. Permafrost commenced to grow downward on the exposed lake bottom in the first winter (1978/1979). The lake bottom has heaved in response to permafrost growth. Large thermal contraction (ice-wedge) cracks opened in the first winter. The freezing point for pore water has been depressed at the freezing fronts where salts have been rejected and pore water expelled. The thickness of the active layer has responded far more to vegetation growth and winter snow cover than to permafrost growth and colder temperatures. Thermal equilibrium of the site is unlikely to be established within the next century.

GENDER AND ECONOMY: THE POLITICS OF URBAN CHANGE by S. Mackenzie, Department of Geography, Carleton University, Ottawa, Ontario K1S 5B6.

Over the last decade, the political agenda of North America has become increasingly focussed around the rhetoric and reality of gender politics. For conservatives, human service cutbacks and constraints on choice are couched in terms of a return to the 'traditional family' and are echoed in policies which question and threaten women's access to resources. At the same time, feminists, working from an understanding that production and reproduction form a social unity, are attempting to defend and extend women's access to resources. All of this is played out through the alternation of social environments.

This paper outlines some of the ways in which feminist geographers have analyzed these changes through documenting the dialectic relationship between gender relations and social environments in periods of social-economic 'crisis'. Focussing on the research on Anglo-North American cities, I shall trace the course of this relationship from the establishment of early Twentieth Century suburbs to the process of urban revitalisation. I shall argue that this research is now leading us to conclude that current economic and social restructuring is altering the basis of gender constitution in fundamental ways and that this is an essential component in emerging forms of urban development and urban political life.

PLANT CLOSINGS AND ACQUISITION by Ian MacLachlan, University of Lethbridge, Lethbridge, Alberta T1K 3M4.

Nearly one-fifth of all large manufacturing plant closures occurring in Ontario between 1981 and 1986 involved a change of ownership in the last three years of the plant's life. In some cases the acquiring firm was pursuing a competitive strategy of horizontal acquisition, purchasing a rival firm to increase its market power and eliminate a competitor. Other acquisitions were motivated to gain control of firm specific assets and plant closure was planned as an integral part of the acquisition strategy. However, the majority of post-acquisition plant closings resulted from failure to successfully integrate new establishments into the corporate production system; closure may be the only means of escaping a bad bargain. Analog models are presented to illustrate the most common spatial patterns of acquisition and plant closure.

SOURCE SEPARATION OF MUNICIPAL SOLID WASTES: A FRAMEWORK FOR COMPARATIVE ANALYSIS by Virginia W. Maclaren, Department of Geography, University of Toronto, Toronto, Ontario, M4S 1A1, and Christine Furedy. Urban Studies Program, York University, North York, Ontario, M3J 1P3.

Source separation of municipal solid waste involves the separation by householders of recyclable materials from the mixed waste stream. The history of source separation in Europe and North America suggests that there have been four main phases of source separation activity in these societies since the late 19th century. These phases have been dominated by the following motivating factors: household income supplementation (Phase I); emergency resource scarcity (Phase II); energy and environmental conservation (Phase III); and solid waste disposal crises (Phase IV). Between these phases, there have also been periods in which there was little or no source separation taking place.

In poor developing countries, household income supplementation remains the driving force behind their high levels of source separation activity. In the richer developing countries, this motivating factor has declined in importance and, along with it, there has been a decline in source separation activity. There is evidence that the next phase will be a turbulent one, with some developing countries experiencing a coalescing of three of the four historic phases in western countries, while others experience periods of decline in source separation activity. We discuss the implications of these developments for municipal solid waste planning and technology transfer between developed and developing countries. In particular, we examine some of the problems created when the motivating factor for the householder changes from an economic to a non-economic one. Examples are drawn from Europe, North America, and East and South Asia.

THE CANADA - ALBERTA FLOOD DAMAGE REDUCTION PROGRAM by R. Bruce MacLock, Alberta Environment, Edmonton, Alberta T5K 2J6.

The Flood Damage Reduction Program was initiated by the Government of Canada in 1974 with a primary objective of discouraging future development in flood risk areas of urban communities across the country. Cost sharing agreements have been signed between the federal government and nine of ten provinces to undertake flood risk mapping and flood plain designation in these communities.

The Canada-Alberta Flood Damage Reduction Agreement was signed in April, 1989. The Agreement has a ten year term and a cost shared budget of $5.5 million, the majority of which is allocated to flood risk mapping in 50 Alberta communities. Once surveys and mapping of 100 year floodplains is complete in each community the flood risk area is designated under a joint announcement of both the provincial and federal Ministers of Environment. within the designated area the provincial and federal governments agree that: no new government buildings will be constructed, no financial assistance will be provided to third parties for construction in the designated area, no government assisted loans, mortgages, guarantees or insurance will be provided, and no disaster assistance will be provided to buildings constructed after designation. The two governments also agree to encourage local zoning authorities to impose land use restrictions to prohibit further development in the designated area. The Agreement also includes allowances for floodproofed development in flood fringes of the designated zone.

The operation of the program across Canada has resulted in the preparation of many high quality flood risk maps and the enactment of consistent and effective government policies limiting development in floodprone areas. In the next 5-10 years similar results are expected in the Province of Alberta.

METHODOLOGICAL ISSUES IN CONTEMPORARY PRODUCER SERVICES RESEARCH: AN EMPIRICAL AND CONCEPTUAL SYNTHESIS by A. MacPherson, J. Lombard, and J.W. Harrington, Department of Geography, University at Buffalo, Buffalo NY 14260.

This paper examines the principal methodological currents in contemporary geographical research on the producer services. Particular attention is focused on the extent to which international an/or interregional trade in producer services acts as an input to regional economic development. By synthesizing a diverse set of research streams in the recent literature, new empirical questions are posed for future research. The paper also presents a partial review of the strengths and weaknesses of popular methodological approaches, including input-output modelling, shift-share analysis, and location-quotient analysis. It is suggested that different methodological choices yield different types of results, especially with regard to the extent of producer-service export activity. The paper concludes by suggesting a set of preliminary guidelines for improving the comparability of future inquiries.

LATERAL AND VERTICAL SEDIMENTOLOGICAL VARIATION DURING FLOODPLAIN ALLUVIATION by F.J. Magilligan, Dept. of Geography, Georgia State University, Atlanta, GA 30303-3083.

This paper examines the variation in sedimentological properties occurring across a fine-grained floodplain of the Galena River in southwest Wisconsin. Because of human land use disturbance, approximately 3 meters of alluviation has occurred within the past 160 years. 97 samples collected from 7 borings across the 340 m floodplain were subsequently analyzed by hydrometer analysis for detailed particle size information. The pre-historical landscape was mantled by a thick (> 4 m) loess cover, and this fine-grained material dominated the particle size of the initial eroded material and largely controlled the resulting texture of floodplain facies. The reversed grading sequence encountered in this valley transect results from the change in texture of the upland sediments during the period of aggradation. The increase in particle size was not uniform across the valley as it depended upon the distance from the stream channel. Distal settings experienced a narrow range of vertical sand increase while proximal and channel fill facies possessed a greater vertical range of sand. Distal settings possess massive, high clay-content sediments usually with less than 1% sand. Samples become coarser and more stratified with decreasing distance to the modern stream channel, with channel fill facies containing approximately 20% sand in the upper sections. Dominance of silt-sized material in this loess-mantled basin maintains the median of the distribution within a fairly narrow range. Only the tails of the distribution vary, which is primarily controlled by the distance to the stream channel. In distal settings the fine tail emerges, while the coarse tail appears in the channel fill and proximal settings. Results from this analysis demonstrate that overbank facies can constitute a large proportion of the overall stored sediment within the floodplain.

EMPOWERMENT AND INNOVATION AT THE GRASSROOTS: HAITI'S EMERGING PEASANT MOVEMENT by Robert E. Maguire, Inter-American Foundation, Rosslyn, Virginia, 22209

In post-Duvalier Haiti, groups of small farmers compose an emerging, 'bottom-up' national peasant movement. Following an emphasis on organization building, community groups or associations of groups endeavor to create and sustain innovative, micro-enterprises that focus primarily on agricultural production, marketing, and credit. Through their social and economic initiatives, gwoupman are attempting to reorder existing human and institutional relationships, and break cycles of persistent poverty.

This paper illustrates those efforts by examining the Peasant Movement of Payape (MPP). It details the continuing obstacles to change emanating from 'the predatory state' and its allies, and documents how groups honed in social organizational skills are struggling to attain a planning and management 'reflex' necessary for successful, sustainable, economic enterprises. More broadly, the paper urges scholars and policy-makers to analyse autonomous grassroots initiatives as necessary, bottom-up steps in a process of participatory, democratic change. In so doing, it supports arguments that grassroots social and economic movements are fundamental in confronting issues of persistent poverty in underdeveloped communities.

AGRICULTURE AND CHANGE IN ACHOMA PERU by Charles G. Mahaffey, Augustana College, Rock Island, Illinois 61201.

The paper highlights results of fieldwork, observation, and interviews undertaken in the village of Achoma in the Colca Valley of southern Peru during portions of 1986, 1987, and 1988, as part of the Colca Valley abandoned Terrace Project, and reflects upon the changes taking place in the Valley over the past decade. Traditional agricultural life of the community is still essentially subsistence in outlook. Achoma is situated amidst dense concentrations of stone-faced agricultural terraces ranging in elevation from 3300 to 3600 meters and irrigated by a complex system of canals which utilize snowmelt from mountain sources some 25 kilometers away and springs issuing within the agricultural lands of the village. Agricultural behavior is influenced heavily by the threats of frost and drought as precipitation averages only 400 millimeters annually and frost possibilities exist at all times of the year. Responses to these constraints have resulted in the magnificent system of terrace and irrigation infrastructure both physical and social which forms the basis of agricultural life in the village. The Achoma farmers are free to make decisions with respect to their plots of land. However, mediating these decisions are those relating to the provision of sufficient irrigation water. Decisions are arrived at collectively with general norms of behavior having evolved historically. As a result of continuously increasing levels of interaction with people from other parts of the Valley and cities such as Arequipa, modifications in behavior and attitudes are taking place within the lives of the village residents which suggest greater consciousness of the possibilities of commercial production, a desire to embrace consumer values, the acceleration of socio-economic differences among the villagers, and an awareness that village life has "changed" irrevocably.

"THE TIGHT GAG OF PLACE AND TIMES": THE SIGNIFICANCE OF PLACE AND TERRITORY IN THE NEGOTIATION OF IDENTITY IN NORTHERN IRELAND

by Niall C. Majury, Department of Geography, University of British Columbia, 217-1984 West Mall, Vancouver, British Columbia, Canada V6T 1W5

Within the geographical literature a growing body of scholarship has come to recognize that popular "culture" is the very medium through which social change is experienced, contested and constituted. Various attempts to unpack this concept have revealed its heterogeneous nature, which is informed by diverse social struggles stemming from the distribution of power within society. Upon analysis any unitary view of "culture" gives way to a "plurality of cultures" and associated social identities-identities which necessarily have a negotiated, contingent, emergent quality, and are constituted, constrained and mediated by space.

Recent interest in the notion of Carnival as a contested social event, whose political significance is inscribed in the landscape, illustrates that like the social construction of identity itself, Carnival can be thought of as a creative construction deeply implicated within the very structure of society. This dynamic relationship between the cultural landscape and identity is explored by way of an analysis of the significance of parades in N. Ireland - a land where a historically rooted struggle over cultural identity and associated power relations has spun a complex "web of significance" in which a "mythologizing form of politics" has come to articulate deep seated economic, political and cultural uncertainties ever present in daily life.

MODELING THE RESPONSE OF CALIFORNIA SHRUBLANDS TO CLIMATE CHANGE.

by George P. Malanson, University of Iowa, Iowa City, IA 52242 and Walter E. Westman, Lawrence Berkeley Laboratory, Berkeley, CA 94720

A computer model designed to simulate the response of Californian coastal sage scrub to various fire regimes has been modified to address questions concerning climate change. Fire intensities, used in the simulation to calculate regeneration, now depend on altered growth functions. The growth functions now use a structure similar to that of forest stand models which calculate reductions in optimum growth for variations in temperature and precipitation. These functions are based on observations of species abundance across their range rather than an assumed, smooth function. The effects of air pollutants under an altered climate are also included. The model examines competition for space among species of Californaian coastal sage scrub and chaparral and uses equilibrium projections for global climate change from the GFDL and GISS general circulation models. Projections show stronger effects for the secondary processes of fire and pollutant regimes, decreased diversity and cover in most cases, and consequent opportunities for invasion.

RECENT EMPLOYMENT TRENDS IN SPECIALIZED SERVICE CITIES OF THE US: SOME IMPLICATIONS FOR URBAN POLITICS

by William J. Mallett, Department of City and Regional Planning, Cornell University, Ithaca, New York, 14853.

Wrenching economic change over the past two decades has fundamentally reconstituted and reordered urban places in the US. This paper analyses change in one constituent part of this reordered urban system namely specialized service cities. Specialized service cities are characterized as old manufacturing centers in which several industrial corporations have headquarter and divisional offices. Such cities include Pittsburgh PA, Rochester NY, and Akron OH. In the past such places have experienced a precipitous decline in manufacturing employment which has been offset by growth in service employment. More specifically, these cities have developed as relatively successful places specializing in advanced services associated with a particular manufacturing base, but neither as strong financial nor business service centers.

Using data from the County Business Patterns I assess recent changes in the occupational structure of specialized service cities and compare emerging trends with other types of high level service centers. Trends are evaluated in terms of changing occupational structures and the alteration in the relative importance of different socio-economic groups. Implications of these changes for the formation of social classes are drawn and related to the modification of bases for the articulation of group interests and their political representation.

INEQUALITY IN SWEDEN: HAS THE SPATIAL DIMENSION BEEN ANNIHILATED?

by Vincent H. Malmström, Dartmouth College, Hanover, N.H. 03755.

Perhaps no other country in the world has sought to equalize the access of its citizenry, regardless of their place of residency, to full economic, social, and political participation in the life of the nation than has Sweden. To find out how successful this policy has been, a detailed study involving more than 93,000 interviews was carried out by the Central Bureau of Statistics of Sweden over a 10-year period between 1975 and 1985. Eleven different measures or indicators were employed, including education, employment, work environment, economic status, housing, transportation, recreation, social relationships, political resources, personal security, and health. The survey was structured to study the Swedish population by socioeconomic groups (defined primarily by occupation and age), by nationality (with an eye to examining the integration of foreign-born workers and their families into Swedish society), and by geographic region (chiefly rural-urban contrasts).

Because the original study made little attempt to examine spatial inequalities in a more conventional regional framework, i.e. by counties or sectional groupings, this paper explores the question of whether significant inequities exist between major physical regions of the country, such as the Central Lowland, the South Swedish Highland, Skåne, Norrland, etc. One conclusion which emerges is that a simple dichotomy between a "wealthy" South and a "poor" North is no longer valid by most measures.

MORPHOLOGY OF HOLOCENE-AGE BURIED PALEOSOLS DEVELOPED IN VALLEY FILL OF THE PAWNEE RIVER, SOUTHWESTERN KANSAS

by R. Mandel, University of Nebraska at Omaha, Omaha, NE 68182.

Morphological characteristics of Holocene-age buried paleosols were studied in the Pawnee River Valley of southwestern Kansas. The paleosols are developed in alluvium, and they range in age from about 10,300 to 1,000 yrs. B.P. Most of the late Holocene soils have A-C or A-Bw horizons; few of these soils have textural B horizons. In contrast, the early and mid-Holocene paleosols generally have thick B horizons that are rich in clay and fine silt. The high clay and fine-silt contents observed in A and B horizons of the early and mid-Holocene soils are attributed to sedimentation processes instead of duration of pedogenesis. Textural data indicate that the parent material of buried paleosols between 10,300 and 5,000 years old is finer than that of younger soils. The record of late-Quaternary landscape evolution suggests that gulley development and concomitant erosion of loess deposits on uplands was accompanied by deposition of fine-silty alluvium on the floodplain of the Pawnee River during the early and middle Holocene. Also, post-Pleistocene desiccation created conditions that were favorable for additions of aerosolic clay and fine silt to alluvial soils. Hence, parent materials strongly influenced the morphology of Holocene-age buried paleosols in the Pawnee River Valley.

ORGANIZING FOR THE AMBIGUITY OF SUSTAINABILITY

by Michael Maniates, Department of Geography, Radford University, Radford, VA 24142.

"Sustainable development" is an ambiguous term. For some it simply means the maintenance of the economic value of a resource over time. For others, it involves safeguarding through perpetuity the physical productivity of resource systems--forests, farms, waterways, climate--crucial to the long-term development of the Third World. And for others it is a call to embrace local participation and a sharing of power between local villages and central cities as central ends to the development process.

This paper does not attempt to reconcile the ambiguity and conflict inherent in the idea of sustainable development. Rather, it begins by pointing out that those who advocate sustainable development, however defined, share the perception that new organizational approaches to resource development and environmental resuscitation are required. It notes that most such "new approaches" involve the collaboration of flexible and locally responsive non-government organizations (NGOs) with larger, centralized development agencies and governments that have traditionally dominated the development agenda. And it poses the question: How (if at all) might such collaborations be engineered so as to effectively combine the talents of small organizations with the expertise of large in the cause of sustainable development?

This question is addressed by invoking lessons from recent efforts in India to integrate local NGOs into national programs of rural resource development. The paper observes that local NGOs can bring much to national programs of environmental and resource management, especially when policymakers wary of the inherent ambiguity of "sustainable development" become reluctant to take decisive policy positions. But it warns that dynamics inherent within these new organizational liaisons can produce programmatic outcomes contrary to policy aims, despite the complementary talents of the large and small organizations. Several general recommendations are offered.

TURBULENT SECURITY ENVIRONMENT AND VARIABLE PROPENSITY TO TRAVEL - THE CASE OF ISRAEL 1948-1989 by Y. Mansfeld, Geography Dept., University of Haifa, Haifa 31999, Israel.

This paper explores the impact of changing security situations on the propensity to visit Israel. Understanding the mechanism behind such impact is vital to a country whose economy is substantially reliant on tourism, on the one hand, and which too often encounters unexpected security turbulence on the other. The study examines two basic questions regarding the impact of security events on the volume and patterns of inbound international tourist flows. The first is whether a correlation exists between the severity of security events and the overall changing propensity to visit Israel. The second question examines whether the reaction to such security stress is geographically and, hence, market differentiated?

The analysis was based on time series data of inbound tourism flows to Israel from1948-1989 and on a preconstructed 'severity scale' of events. The results prove that level of severity (measured by duration, nature and geographical location of security events) is highly correlated with the variable pattern of incoming tourist flows. Moreover, it appears that the propensity to visit Israel while the security situation is unbalanced is distinctively geographically differentiated. The further the market is from Israel, the more sensitive it becomes to the unrest there. Thus, the volume of tourist flows from Europe has been less affected compared with that from North America.

* * * * *

AN EXPLORATORY LOOK AT THE DIFFUSION OF AIDS IN TUNISIA by J. T. Manzo, Concord College, Athens, West Virginia 24712.

Tracking the spread of AIDS in North Africa has proven more difficult than in Europe and the United States. While no new statistics are offered here, insight into the diffusion process in the Maghrib can be gained through an exploratory examination of the problem in Tunisia. Data indicate younger Tunisian males will be the primary cohort introducing the virus to the population at large. This will occur as males between seventeen and thirty-five come in contact with prostitutes, international students, and hetero and homosexual tourists. Moreover, the virus may be contracted by migrant workers abroad. A Joseph J. Malone fellowship administered by the National Council on US-Arab Relations provided five weeks of field experience in the summer of 1987. Meetings with Tunisian and visiting foreign scholars, peace corp members, and field observation furnished the basis for this presentation.

THE SPATIAL STRUCTURE OF AIR PASSENGER SERVICE FOR KIEV AND TASHKENT by Thomas Maraffa, Department of Geography, Youngstown State University, Youngstown, Ohio 44555 and Matthew Sagers, Center for International Research, Bureau of the Census, Washington, D. C. 20233.

A hierarchy of air passenger centers exists in the Soviet Union. A previous paper by the authors examined Moscow's role as the dominant air passenger center. This paper studies two regional centers, Kiev and Tashkent. Nonstop flight connections, characteristics of cities with nonstop links, and the fare structure are analyzed and compared for each city. Comparisons are also made with the results of the Moscow study and with service patterns observed in similar U.S. cities.

Both Kiev and Tashkent play dual roles in the Soviet air system. They are important air traffic centers by virtue of their roles as major economic centers. But their reach is more extensive than for comparable U.S. cities, although flight frequencies are far lower. Second, they are centers of "local" networks serving regional hinterlands. In this way they act as hubs linking these places with larger centers. Air fares from these cities reflect pricing policies of the Soviet Government and are strongly associated with distance.

USE OF THE GREY-LEVEL-COOCCURRENCE-MATRIX (GLCM) TEXTURE-ANALYSIS METHOD IN LAND-COVER CLASSIFICATION by D. Marceau, P.J. Howarth, Earth-Observations Laboratory, Department of Geography, University of Waterloo, Waterloo, Ontario N2L 3G1, and J-M. Dubois, CARTEL, Département de géographie, Université de Sherbrooke, Sherbrooke, Québec J1K 2R1.

The GLCM is one of the most common methods used to extract texture information from a digital image. This method depends on several factors such as the spatial resolution, the spectral band, the quantization level of the image, the size of the sliding window, the inter-pixel distance and angle during the cooccurrence computation, and the statistics used as texture measures. The present study was conducted to evaluate the influence of the three primary factors on land-cover classification using a spectral/textural approach.

Textural features were created from a SPOT near-infrared image (baie des Chaleurs, PEPS no.97) using four texture indices, seven window sizes, and two quantization levels. A supervised classification of nine cover types based on the maximum-likelihood algorithm was performed on the three SPOT spectral bands combined with each texture feature. The classification accuracy is measured by the Kappa coefficient calculated from confusion matrices. A factor analysis permits the evaluation of the contribution of each variable to the classification accuracy.

The addition of a texture feature brings a significant improvement to the classification accuracy of each cover type compared with the results obtained from the multispectral analysis alone. The window size accounts for 90% of this improvement, while 7% is explained by the texture measures and 3% by the quantization level. There is a window size which optimizes the discrimination of each cover type.

THE DISTRIBUTION OF DRUG ADDICTION IN GREATER MONTREAL, 1986 by C. Marchand, Intergovernmental Committee on Urban and Regional Research Toronto, Ontario M4P 1E8 and L. Proulx, Université de Montréal, Mont tréal

This paper first reviews the theory of anomia as applied to drug addiction and in the light of previous studies conducted in the U.S. it puts forth an hypothesis for its spatial distribution in Montreal In particular, it is thought that the consumption of illegal drugs will be higest in the CBD while abuse of prescribed drugs and alcohc will be more diffused across the Census Metropolitan Area. The data used is then presented as a complete census of male and female populations in 6 rehabilitation centers of the Greater Montreal Area for the year 1986 (5507 cases). A factor analysis presents the major trends in multiple drug addiction whereas a trend surface analysis conveys the spatial pattern present in the overall distribution as concentrated in the CBD and in the southeast of Montreal. Moreover cartography of individual types of addictionreveals that there are no major differences in their distribution. Regression analysis then describes areas at risk as regions characterized by a population of poor unemployed francophones with a low level of education and who are generally isolated as they are unmarried, divorced or widowed.

1948-89 MASS BALANCE AND CLIMATIC CHANGE, LEMON CREEK GLACIER, ALASKA by Melvin G. Marcus, Arizona State University, Tempe, Arizona, 85287.

The mass balance and climatic record of Lemon Creek Glacier, Alaska, has been monitored since 1948. The glacier was mapped at 1:10,000 and the 5-m contour interval in 1948 and 1957, the latter date in association with International Geophysical Year mapping of eight "representative" glaciers in Alaska. In summer, 1989, ground control was resurveyed and new aerial photography flown. Both optical and electronic distance surveying provided eight precisely located control points for photogrammetric plotting. A new map was constructed, also at 1:10,000 and 5-m, and is presented in this paper.

Mass balance losses over the 32-year period have been calculated and are compared both to annual mass balances estimated by the firn line-elevation method and yearly determinations by various workers during the past three decades. Taken with the 1986 mapping of West Gulkana Glacier in the eastern Alaska Range, another IGY glacier, there is a basis for latitudinal and locational comparisons of the glaciers' responses to climatic change, especially as related to synoptic patterns.

SEDIMENT SOURCES IN THE UPPER SOUTH RIVER ESTUARY, MARYLAND by W. Andrew Marcus and Michael S. Kearney, Department of Geography, University of Maryland, College Park, MD 20742.

Sedimentation of Chesapeake Bay tributary estuaries has led to infilling of navigation ways, burial of benthic habitats, and degradation of water quality. The coincident timing of these problems with extensive land clearing for agriculture in the 1800's had led many researchers to attribute the increases in sedimentation rates to erosion associated with European settlement. Data from a sediment budget for the upper South River, Maryland, suggest that coastal erosion may in fact be the primary source of sediment to many Chesapeake tributary estuaries.

Estimates of fluvial inputs to the estuary between 1846 and 1970 range from 115,00 to 352,000 tonnes. The fate of the majority of this sediment can be accounted for through marsh accretion at tributary mouths (52,000 tonnes) and subtidal storage within a kilometer of stream mouths (approximately 264,000 tonnes). Conservative estimates indicate that shoreline erosion has contributed 1,427,000 tonnes of sediment to the estuary, approximately four times the maximum quantity likely to have been contributed from fluvial sources.

Most management plans in the Chesapeake region have focused on controlling fluvial inputs as the primary source of sediment to tributary estuaries. If shoreline erosion is the primary source of materials, then expectations for controlling sedimentation and turbidity in many Chesapeake estuaries may not be realized.

CHINATOWNS: DOWNTOWN SANCTUARIES, IMMIGRANT ASIAN RECEPTION AREAS AND FESTIVAL MARKETPLACES by Harry L. Margulis,Cleveland State University, Cleveland, Ohio 44115 and Verghese J. Chirayath, John Carroll University, University Heights, Ohio 44118.

Cleveland's Civic Vision 2000 Plan envisions creating an Asian Village, a festival marketplace adjoining the city's downtown. The goal is to produce a unique pedestrian neighborhood serving the region's Asian community and a stimulating activity node for downtown business people and tourists.

To study the project's feasibility, Chinatowns in 15 cities in Canada and the United States were visited. Field research reveals that planning departments working with nonprofit local development corporations (LDCs) and for-profit private developers are rejuvenating Chinatowns. LDCs are instrumental in formulating strategic community plans and negotiating community benefit packages. Implementation often includes special district designations to strengthen an area's Asian identity, revising land use and zoning codes to permit low density mixed commercial- residential development while restricting institutional, industrial and office encroachment, developing design standards for Chinese streetscapes, and building community access, capacity and resources. Where Chinatowns serve as immigrant reception areas or sanctuaries for elderly non-English speaking Asians, providing community social services and health programs, preserving and expanding low- and moderate-income affordable housing, job creation and business diversification are important priorities.

GIS AND PATTISON'S "THE FOUR TRADITIONS OF GEOGRAPHY" by **David M. Mark**, National Center for Geographic Information and Analysis, Department of Geography, State University of New York at Buffalo, Buffalo, New York 14260

In a paper published in THE JOURNAL OF GEOGRAPHY in 1964, William D. Pattison interpreted the essence of geography within the context of four "traditions whose identification provides an alternative to the competing monistic traditions that have been the geographer's lot." Pattison identified the four traditions as: (1) a spatial tradition, (2) an area studies tradition, (3) a man-land tradition, and (4) an earth science tradition. This paper comments on the role of geographic information systems (GIS) in geography, and their relations to the intellectual core of basic geography research, by showing how GIS either incorporates the fundamental tenets of these traditional views, or provides an enabling technology to facilitate studies conducted within the "four traditions."

THE RISE OF THE GUNBELT by Ann Markusen, Department of Urban Planning and Policy Development, Lucy Stone Hall, Rutgers University, New Brunswick, N.J. 08903.

Since World War II, a large permanent military industrial complex has developed in the United States. Currently funded in excess of $300 billion per year, this segment of the economy is highly technical and research-intensive, and has constituted a major infrastructural investment in new manufacturing capacity. The bulk of this investment has taken place outside of the traditional industrial heartland, and is a major factor in the relocation of American population and employment in the postwar period. The location of defense manufacturing and services in relatively peripheral locations is a result of clashes in regional business culture as well as preferences on the part of the military and certain other political actors. The development of new spatial military-industrial complexes involved substantial publicly-financed interregional migration of heavily defense-dependent occupational groups and was a major factor in the genesis of high tech complexes like those around Boston and Los Angeles. Research results from five years of intensive interviewing and historical research show that this phenomenon, the rise of a "gunbelt," is an underappreciated and much misunderstood factor in American economic geography.

* * *

SPATIAL TENDENCIES, OF DEMOGRAPHIC AGING ON THE ISLAND OF MONTREAL, 1971-1986.

MAROIS C., THOUEZ J.P., BUSSIERE Y..
Department of geography, University of Montreal, Montréal. Québec.
H3C 3J7.

The demographic characteristics of aging in Quebec are similar to those observed in the population of other Western countries. However, compared to those countries the province's proportion of elderly people is little important even though it is growing faster. The object of this article is to present the geographical and statistical aspects of aging per CLSC on the island of Montreal. Between 1971 and 1986, the spatial tendencies show a diffusion of aging for the island, with concentration of the oldest (75 and over) in the central area, particularly in zones occupied predominantly by people of foreign origin. Aging touches all socio-economic groups and seems even more pronounced due to the fact that the island's demographic growth was negative during the period. This phenomena raises many questions. One being the capacity of services to satisfy the upcoming demand for care and social service.

SHORT PERIOD NORTH ATLANTIC CLIMATE FLUCTUATIONS by Merlin M.L. Marshall, Geography Department, The Ohio State University, Columbus, Ohio 43210.

An examination of the instrumental temperature record for the Northern Hemisphere reveals shifting climatic conditions. The overall temperature trend from the data has indicated a general warming with time. Superimposed on this trend are fluctuations of shorter duration, such as the period of cooling in the 1960's and 1970's in the eastern United States. Research on shorter period regimes has tended to be localized to one small area, or one particular event, without relating the pattern to the larger scale spatially or temporally.

The purpose of the research presented here is to examine climate fluctuations on the order of five to fifteen years duration as can be found in the sea surface temperature and marine air temperature data from the North Atlantic region. These short period climatic regimes are identified using principle component analysis. PCA produces eigenvector forms which can resemble observed and recurrent spatial patterns in the variable being analyzed. This procedure also produces a time series from which the years of occurrence of these patterns can be determined. Composite analysis then is used to indicate the actual air and sea temperature patterns in the North Atlantic. The characteristics of these short period regimes will be discussed.

CHANGES IN GLACIER RUNOFF IN THE WIND RIVER RANGE, WYOMING by R. Marston, L. Pochop, G. Kerr, D. Veryzer, University of Wyoming, Laramie, Wyoming 82071, and M. Varuska, U.S. Air Force Academy, Colorado 80840.

The largest concentration of glaciers in the American Rocky Mountains occurs in the Wind River Range of Wyoming. We have documented the loss of ice in Dinwoody and Gannett glaciers since the 1930's, the remaining volume of ice in Dinwoody Glacier, and the importance of glacier meltwater to overall water supply in the Wind River drainage. Repeat photography illustrates dramatic reductions in the thickness of glacier ice and the position of glacier termini. The reduction in glacier volume over time has been measured from aerial photo stereopairs using a stereo zoom transfer scope fitted with a vertical measurement module. These data were field checked by comparing elevation data with topographic maps of the glacier surface. Point measurements of ice thickness were acquired on Dinwoody Glacier using a portable monopulse-radar unit. These data provide an estimate of remaining ice volume.

The volume of ice lost from Gannett and Dinwoody Glaciers in the past five decades is significant when compared to current runoff data. The contribution of glaciers to streamflow are most important in late summer when runoff from other sources is particularly limited. As the glaciers recede, the effects of reduced water supply will be far-reaching. From local irrigation to interstate water compacts, users will have to accept and plan for a reduction in summer water supply.

CITY RATINGS AND THE QUALITY OF URBAN LIFE, by Judith A. Martin, Geography Dept/Urban Studies Program, University of Minnesota, Minneapolis, Minn., 55455

Throughout the 1980s Rand-McNally and other publishers have made America's urban citizens aware, sometimes painfully, of their own city's standing with respect to all others. Geographers and others have argued that these ratings schemes are facile and often miss the point. Most rebuttals concern themselves with the minutae of the statistical computations that create the final scoring and rankings. Such criticism is valid, but one can perhaps learn more by examining the construction of the categories being measured. The obvious biases contained therein betray a wealth of cultural assumptions, some of which are ridiculous on their own merit and preposterous when thought of as an index to quality of life for real people. This paper will examine several of the published ratings schemes as they apply to the Twin Cities and select other metropolitan areas. The focus is the discontinuity between the ratings categories and the reality of living in most American cities.

IMPLICATIONS OF THE US-CANADA FREE TRADE AGREEMENT FOR AGRICULTURE IN WESTERN OREGON by Michael Martin, Oregon State University, Corvallis, Oregon 97336 and Gil Latz, Portland State University, Portland, Oregon 97207.

The U.S.-Canada Free Trade Agreement (FTA) will reduce bilateral barriers to trade over a ten year period from 1989-99. The purpose of this paper is to explore a specific set of opportunities and competitive challenges resulting from the Agreement with particular reference to agricultural trade. Oregon's Willamette Valley (Western Oregon) will serve as a case study of the implications for commodity trade with Canada. The research findings will demonstrate that Oregon's farmers should find new market opportunities in Canada (particularly Western Canada) for high valued and value added products such as: processed vegetables, tree fruits, fresh and processed fruits, and wines. Reduced import barriers should allow these suppliers to exploit location and climate advantages in serving western Canada urban markets. At the same time, the FTA will also increase competition from Canada for other U.S. and Oregon industries. For example, domestic pork producers, producers of oil seeds and oil seed products, and some forest products industries will face intensified competition from Canadian imports. A concluding comment in the paper includes a proposal for marketing strategies appropriate to agricultural suppliers to the Canadian market.

METEOROLOGICAL CONDITIONS ASSOCIATED WITH POOR AIR QUALITY IN CHARLOTTE, NORTH CAROLINA by Walter Martin, University of North Carolina at Charlotte, Charlotte, North Carolina 28223.

During the last decade summer air quality in Charlotte, North Carolina has declined. Ozone is the leading criteria pollutant responsible for degrading Charlotte's summer air quality. This study is an initial attempt to identify meteorological conditions associated with high ozone events in Charlotte. Ambient levels of ozone were measured and recorded by the Mecklenburg County Environmental Protection Department using three continuous recording monitors aligned within the county from southwest to northeast along the prevailing wind vector. Meteorological data were recorded by the National Weather Service Office and obtained from the National Climate Data Center. Ozone levels during the three month period between June and August of 1988 were compared with temperature, dew point, wind direction, wind speed, barometric pressure, relative humidity, and day of the week. Significant predictors from initial multiple regression models include temperature, wind speed, and relative humidity.

A GEOGRAPHICAL ANALYSIS OF CONGRESSIONAL ROLL CALL VOTING BEHAVIOR by Kenneth C. Martis, Geography Program, West Virginia University, Morgantown, West Virginia 26506

Social scientists have long recognized the significance of district, local, state, regional, and sectional influences in policy making and roll call voting behavior in the United States Congress. A procedure is outlined to study this geographic structure for the first time using spatial analytical methods and interactive computer-generated color roll call voting maps. In order to carry out this study and subsequent research of this kind, relational database software are being developed for a very large set of cross-sectional time-series data, including: (1) more than 15,000,000 individual voting decisions by United States representatives and senators since 1789, and (2) the first digitized maps of congressional district boundaries for each of the 101 Congresses and maps of the states to represent the Senate. A number of traditional hypotheses concerning congressional roll call voting behavior are discussed, especially with respect to their geographical component.

DIURNAL VARIATION IN PRECIPITATION FREQUENCY OVER THE CENTRAL PLAINS OF THE UNITED STATES by Carmen Masó, University of Oklahoma, Norman, Oklahoma 73019.

A daytime maximum of the diurnal rainfall cycle is the expected pattern for the Central Plains of the United States during the warm season. The combination of strong surface heating, high moisture levels, and continental location is mainly responsible for this rainfall regime. Precipitation frequencies over the Central Plains, however, generally exhibit a maximum during the late evening hours. Thus, the diurnal rainfall cycle seems to be completely out of phase.

In this study the diurnal variation of precipitation is investigated using Geostationary Operational Environmental Satellite (GOES) images. An harmonic analysis of hourly GOES infrared data from May 1,1986 to September 29,1986 gives insight into the temporal and spatial rainfall patterns of the Central Plains. This type of analysis appears to be an effective way to study regional rainfall patterns.

A LANDSCAPE OF LEISURE IN HISTORICAL PERSPECTIVE: UNDERSTANDING ATLANTIC CITY by Randy Mason, The Pennsylvania State University, University Park, PA 16802

This paper's errand is to seek a new way of looking at landscape, in particular a popular-culture landscape of leisure, using archival sources and historical maps as well as the extant visual landscape to cultivate a perspective based on broad knowledge of place. The landscape engaged here is that of Atlantic City, an urban leisure place purposely built in the nineteenth century which has enjoyed notoriety throughout its history (and not least because it is now a venue for legalized casino gambling). A number of dialectical relationships of leisure landscapes are developed in historical perspective -- both in the built environment and the social geography of the city -- and discussed in the context of Atlantic City.

GREENLINE PARKS: LAND-USE CONFLICTS IN EXURBIA by Robert J. Mason, Temple University, Philadelphia, Pennsylvania 19122.

Greenline parks are designed to protect ecological, aesthetic, and cultural values within regional settings. They are comprised of both private and public lands, and are managed by such means as zoning, protective easements, land trusts, tax incentives, and--usually to a limited degree--public acquisition. While no mechanism exists for formal designation of greenline parks, several existing parks and reserves meet the criteria put forth by greenline proponents. Chief among them are New Jersey's Pinelands National Reserve and New York State's Adirondack Park. The greenline concept has also been endorsed in the recent recommendations of the President's Commission on Americans Outdoors.

This analysis focuses on a small number of case studies of greenline park management. The interests most influential in greenline management include environmental preservation, recreation, homebuilding, and agriculture. There is also evidence of growing public and political interest in sustaining viable local economies within ecologically and aesthetically "correct" regional settings. Yet this interest is diffuse, and lacks the political effectiveness of the more clearly defined development and preservation interests. As a result, valued cultural landscapes are more commonly managed by political compromise than through comprehensive regional planning. Even in an era of growing environmental concern, the prospects for basic change in this relationship appear quite limited.

REGIONAL PLANNING DECISION-MAKING PERSPECTIVES by Michele Masucci, Department of Geography, West Georgia College, Carrollton, GA 30118.

Regional planning models, as developed and applied to the American experience, concentrate on decision-making processes. Models may be categorized according to the organization of decisions in formulating plans and projects and according to the relative order in which these decisions are made. Theoretical models, including sequential, systems, and flow models, often imply decision-making roles beyond that of the planner. Three roles are essential to an understanding of regional planning decision making in the U.S. context. These include the planner, politician, and constituent (or resident) roles.

The purpose of this paper is to present the spatial and locational point of view for the planner, politician, and constituent roles as a combination of personal experience and group identification. The notion that people perceive space differently according to the group they identify with at any given moment is not reflected in standard theoretical representations of conflict resolution and regional problem solving. The impact of including new roles in theoretical models is addressed through the interpretation of simulation content and the application of new spatial contructs for decision makers.

CARTOGRAPHIC TRAINING IN THE EARLY NINETEENTH CENTURY by Stephen Matchak, Salem State College, Salem, Ma 01970.

While maps of the early-nineteenth century frontier, especially those drafted by the Army's Corps of Engineers, are well known, relatively little attention has been paid to cartographic training in that time period. This paper discusses the nature of cartographic education by examining period material. While most cartographic instruction seems tied to surveying texts, other primary sources range from government directives to literary travelogues. The material not only indicates the level of sophistication commanded by cartographers but provides a context for their maps as well. Moreover, the study suggests a perspective on the role and purposes of cartography in the nation's development.

GEOGRAPHIC ASPECTS: CONTINENTAL SHARING BY UNITED STATES AND CANADA by Cotton Mather, New Mexico Geographical Society, P. O. Box 1184, Mesilla, New Mexico 88046.

The purpose here is to perceive the three geographic stages that have evolved in the United States and Canada. The first stage was mainly that of wilderness, land before man. Then came the man-land stages, in which the second was the definition by man of proprietary use. The third stage, now in development, is that of proprietary responsibility. Involved are such diverse geographic elements as economic commodities, migratory labor, tourism, video and radio transmission, transportation, water use, air pollution, capital, and cultural assemblages. These are active elements which we portray within the static confines of our national boundaries. Our conclusion may be that these two friendly nations have a problem, especially if they view the problem as being bilateral.

HISTORY OF HYDROCLIMATOLOGY by John R. Mather, Department of Geography, University of Delaware, Newark, Delaware 19716.

The hydrologic cycle provides the basis for any study of hydroclimatology. While the components of the cycle--precipitation, evapotranspiration, streamflow, subsurface flow, interception, soil moisture and groundwater storage--are easily identified, obtaining reliable estimates of each component over varying time and space scales is far from straightforward.

Hydroclimatology traces its roots, in part, back to the early Greek philosophers. While precipitation measurements were among the earliest of recorded climatic observations, it was the effort to understand the hydrologic cycle that served as a focus for debate and study during the early history of the field. Even though Palissy, a 16th century French potter and naturalist (and later Perrault, Mariotte and Halley) gave convincing proof that precipitation served as the source of water for streamflow, the hydrologic cycle continues to be misinterpreted.

Consideration of more recent controversies involving the effect of land use change on precipitation and other factors of the cycle, the estimation of evapotranspiration losses, and the use of a climatic water budget approach in hydroclimatology, all help illustrate current directions of work in the field.

An important aspect of recent work in global hydroclimatology involves the effort to achieve indices to express the relative moistness or aridity of a climate. The historical development of the Thornthwaite climatic moisture index is discussed along with the contributions of later modifications of the index. The paper concludes with a discussion of current problems and the nature of future data collection and research efforts needed to achieve solutions.

JOHN MICHAEL TREACY (1948-1989): A TRIBUTE. William M. Denevan, University of Wisconsin, Madison WI 53706, and Kent Mathewson, Louisiana State University, Baton Rouge, LA 70803.

John Treacy was to have given a paper on Andean terrace abandonment in this session. His untimely death last October prevents this. Instead the presenters (his former major professor and a student contemporary) offer a tribute to John Treacy as cultural geographer, former student, and friend.

CLIMATE AND DOMESTIC ENERGY CONSUMPTION by Kenji Matsuura, University of Delaware, Newark, Delaware 19716.

A considerable amount of energy is consumed by cities, and much of it is used for domestic purposes (space heating and air-conditioning). Urban environmental characteristics such as the heat island and the high density of buildings influence domestic energy consumption. A heat island, for example, may reduce heating expenses in winter while increasing air-conditioning costs in summer. This paper examines the effects of local changes in climate and urban morphology on energy consumption in buildings. Hypothetical built environments are established. Energy consumption by a single building is calculated for changing climate conditions and urban morphologies. An augmented building energy load estimation program, "BLAST", which has been developed by the U.S. Army Construction Engineering Research Laboratory, is used to make the necessary computations.

TORONTO OFFICES: SUBURBAN PATTERNS AND PROCESSES by Malcolm Matthew, Associate Professor, Department of Geography, University of Windsor.

This study investigated the extent to which offices in office buildings have decentralized, the types of offices in suburban office centres, and the reasons for locating them there. As two thirds of Canada's metropolitan population lives in suburbs, we should understand the dynamics of suburban office location.

The study examined the 1951 to 1986 decentralization of offices in Toronto; and identified 1966 to 1986 changes in land use, built form and the types of office function in three suburban centres. Short interviews determined the characteristics of office establishments in the centres in 1988. Detailed interviews of office executives probed the factors which influenced their location decisions.

The study established that, while five sixths of Toronto's office building space was in the CBD in 1951, by 1986 half of it was elsewhere, mainly in nineteen office centres. The three centres studied clearly differ in average establishment size, in branch/head offices ratios, in dominant office function, and in functional diversity.

Highway access is the critical influence in location decisions. Public transit, convenient commuting, and suitability of accommodation may be considered. The bid-rent curve for vacant office space was found to plummet at the edge of the financial district, with equal rents in other parts of the CBD and in some other centres.

The study indicated guidelines for the location, size and layout of office centres. The findings support Daniels' stage model, and indicate that a hierarchy of office centres may be emerging.

THE LAW OF THE ARKANSAS by Olen Paul Matthews, Oklahoma State University, Stillwater, OK 74078

Few large river basins in the United States have an integrated water management system. The Arkansas River basin illustrates the transboundary legal problems created when mobile resources, such as water, are managed in a fragmented way. Conflicts over water allocation and water quality can occur at different scales including conflicts between individual property owners, local government units, states and even agencies within the federal government. Legal problems can also occur between these different scales as shown by conflicts between federal and state water law. A major reason for the Arkansas River basin's legal problems results from the fragmented legal jurisdiction that allows local or special interest groups to influence policy. Navigation, irrigation, recreation and water quality are all important goals, but they can be contradictory when looking at an entire river basin. The legal system has four different legal processes to resolve problems: judicial, legislative, administrative and negotiated agreements. Although each of these legal processes is currently in use in the basin, the processes are not all effective and, indeed, are part of the fragmented management problem. I will examine the problems found in the basin, the legal solutions used to resolve these conflicts, and point out continuing problems. Solutions to these problems will be suggested.

SURVIVAL ANALYSIS FOR YOUTH LABOUR MARKET DATA
by Stephen A.MATTHEWS
Department of Geography, UCLA, Los Angeles, California, 90024.

Geographers are relatively new to longitudinal analysis. However, it is unlikely that they will remain untouched by the developments in, and availability of, analytical techniques and suitable longitudinal data sets which include spatial information. Longitudinal data, particularly micro-level multi-wave panels, have a number of attractive features which labour market, migration geographers and others should be made aware. Since most of our knowledge of change processes to date rests on cross-sectional findings, longitudinal studies are not merely desirable - they are mandatory. Hence their development, application and critical assessment should be strongly encouraged.

The data set used in this paper is drawn from the National Child Development Study (1958-UK), a continuing longitudinal data set. It is suggested that the comprehensive coverage, both longitudinally and spatially, of the NCDS overcomes many of the limitations shared by past employment history surveys in the UK. As a result the NCDS offers enormous potential for the analysis of social processes such as the transition from school to work and the labour market experiences of young adults. The results presented are based on survival techniques and Cox's proportional hazards model.

SECONDARY MIGRATION OF INDOCHINESE REFUGEES WITHIN CALIFORNIA by Doreen J. Mattingly and W.A.V. Clark, Department of Geography, University of California, Los Angeles, 90024.

Since 1975, over 600,000 refugees from Vietnam, Laos and Cambodia have migrated to the United States. Despite government attempts to disperse refugees, their spatial concentration is increasing. Over one third of the nation's Indochinese refugees now live in California, and within the state the majority reside in only a few counties. This unplanned clustering is above all the outcome of secondary migration of refugees away from their place of initial resettlement.

Secondary migration between counties in California is analyzed to identify factors influencing refugees' choice of destination. The motivation is a complex combination of the role of ethnic communities formed by earlier migrations and economic forces, particularly low rents and high public assistance benefit levels.

MARGINAL AGRICULTURE: A YUKON CASE STUDY by J. Maurer, Department of Geography, University of Toronto, Toronto, Ontario M5S 1A1.

Agriculture has been part of the Yukon's settlement history since the North West Company set up fur trading posts in the early 1800's but the Yukon's climate, soils and population base are not considered favourable to supporting an agricultural industry. The northern margins are especially susceptible to the environmental impacts of both modern and subsistence farming practices. In spite of these physical and economic constraints, recent strategies adopted by the territorial government actively promote the notion of food import substitution as one means of diversifying the Yukon's economic base.

This paper explores the relationship between sustainable development and northern agriculture by reviewing the socio-economic and physical characteristics associated with marginal farming and relating these characteristics to agricultural development in the Yukon. With special reference to factors which appear to favour the persistence or sustainability of marginal farming, the paper discusses the location and nature of existing and proposed agricultural land dispositions, the level of government and infrastructure support, and the economic and socio-cultural characteristics of the Yukon's arable regions. The analysis indicates that government subsidization of the industry and long term planning of the limited land resource are both essential if farming is to take place in the territory. And, at the regional scale, responsible agricultural planning, incorporating the physical, the socio-cultural and the economic characteristics associated with agricultural activity in the north, can be considered compatible with the concept of sustainable development in the context of the Yukon government's recent economic development strategies.

SOIL PATTERN DELINEATIONS USING COMPUTER ANALYZED MULTISPECTRAL VIDEO DATA by P. W. Mausel, Indiana State University, Terre Haute, IN 47809

Multispectral video data collected in May, 1988 over west central Indiana (yellow-green, red, and near infrared) and in July, 1989 over southern Alabama (green, red, near-infrared, and mid-infrared) were computer analyzed to provide insight into nature of soils boundaries delineated. Insights into the information derived from such analyses potentially can aid in soil survey mapping.

Unsupervised classification of original and transformed (ratio, and principal component) three band (May, 1988-Indiana) and four band (July, 1989-Alabama) multispectral data with 2 m resolution average was conducted over bare or predominantly bare fields. Separability analysis was used to group clusters that were spectrally similar. The resulting spectral soil boundaries were compared with existing detailed soil series maps and analyzed.

The results of analysis indicate that high resolution multispectral video data delineates sub-soil series regions which define selected soil parameters (i.e. chroma, value, organic content) with detail not available in published sources. This information could be of value in helping to delineate soil boundaries for new surveys or updating existing surveys.

FOREST COVER DETECTION IN THAILAND by Donald W. Maxfield, Northern Illinois University, Dekalb, Il 60115

The use of weather satellite (NOAA-9) sensor data (AVHRR) for biomass study is well documented in the remote sensing literature. The purpose being to evaluate the relative vigor and areal extent of vegetation growth via satellite data for a large region or a national level inventory. Applications include grassland/ rangeland studies, monitoring crop growth, desertification and forest land inventory. A demonstration project in Thailand illustrates a regional application in a Third World country where forest land inventories are of national importance.

A dry season, March 6, 1986, AVHRR (LAC) data set having one kilometer resolution was acquired and a normalized vegetation index (NOVI) was computed to maximize biomass (forest) detection. Four Changwat and twenty-seven Amphor boundaries have been geographically referenced to the NOVI image and superimposed showing the spatial distribution of forest cover within each Amphor. The percentage of forest land cover per amphor can be calculated. Since AVHRR data can be collected over the same area every two days at a very low cost, change detection can monitor the rate of deforestation through time.

THE GEOGRAPHER'S RESPONSIBILITY IN THE CONSERVATION OF NATURAL RESOURCES by O. Orland Maxfield, Department of Geography, University of Arkansas, Fayetteville, Arkansas 72701.

It appears that geographers are giving scant attention to the conservation of natural resources. Surveys and analyses of literature in the leading professional geographical periodicals, the texts on natural resource problems, papers given at professional meetings, and college enrollments in geography courses, all attest to this neglect of a field that is of paramount importance to the nation's welfare. The subject, once of importance in geography, has been forsaken for the more fashionable ecological and environmental studies, which are of significane in their own right but are not synonymous with or take the place of conservation. Geographers have a unique niche to fill in the maintenance of the nation's natural resources and meeting current and future needs of its citizens. They should rediscover the role of conservation and apply their knowledge and talents to finding the wisest solutions to resource problems.

THE PAUCITY OF STRATIFIED CLOVIS SITES IN VALLEYS ON THE CENTRAL GREAT PLAINS by D. W. May, University of Northern Iowa, Cedar Falls, Iowa 50614-0406.

Although Clovis Paleo-Indian projectile points have been found on the surface in a variety of landscape positions on the central Great Plains, very few stratified Clovis sites (11,500-11,000 years B.P.) have been discovered in valleys. The potential for preservation of Clovis sites in alluvial settings on the central Great Plains is assessed using the late-Pleistocene alluvial records from the Loup River Basin of central Nebraska, and from the Medicine Creek Basin of south-central Nebraska.

In the Loup River basin a thick and widespread sandy valley fill has three radiocarbon ages of about 14,000 yr B.P. The age of the next youngest alluvium in the Loup River Basin is 10,500 yr B.P. This alluvium unconformably overlies incised remnants of the 14,000-year-old sandy valley fill. Thus, in at least the Loup River Basin of Nebraska the absence of buried Clovis sites can probably be attributed largely to fluvial erosion of 14,000 to 10,500-year-old alluvium.

The late-Pleistocene alluvial record of the Medicine Creek Basin is less well known than that of the Loup River Basin, yet the discovery in alluvium of buried mammoth bones that appear to have cultural material associated with them suggests that a buried Clovis site exists in this basin. The collagen fraction of two bone fragments at this site have radiocarbon ages of about 18,000 and 12,000 yr B.P. Preservation of alluvium of this age is not widespread in the basin. Locally its preservation is a consequence of tectonic and structural control on the evolution of the valley.

GREAT LAKES AND ST. LAWRENCE SEAWAY SHIPPING AND PORTS: U.S. AND CANADIAN POLICY DIFFERENCES by Harold M. Mayer, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53201.

Three decades of operation of the St. Lawrence Seaway have resulted in significant differences in the Seaway's impact upon both the United States and Canada, and consequently upon differences in policy between the two nations relative to future status and development of the waterway and the major Great Lakes ports. Some of these differences originated in the process of planning the Seaway, but others became increasingly evident as the waterway's built-in physical and economic limitations affected its use by the traffic of each country in different ways.

Shifting trade patterns, technological changes in transportation, and changing multi-modal transportation policies have each affected the relations of the Seaway and the Great Lakes ports differnetly in each of the two nations. In some respects the Seaway is of much greater importance to Canada than it is to the United States.

WHY DO SOME RURAL RESIDENTS LEAVE THEIR HOME COMMUNITIES FOR OUTPATIENT VISITS? by J. Mayer, University of Washington, DP-10, Seattle WA 98195 and L.G. Hart, University of Washington, HQ-30, Seattle WA 98195.

Of the little that is known about patient travel patterns for outpatient care in rural areas, one of the certainties is that some residents remain in their home communities for care, while others seek their care in other towns or even in metropolitan areas. Indeed, one study suggests that nearly 50 percent of all physician visits for rural counties occur outside the patient's home county. Some of these visits are for specialty services which are unavailable in small rural communities, but many visits seem to be for primary care. Out of town visits might appear to be inconvenient for the patient, since they necessarily entail travel and inconvenience. Why, then, do these individuals choose to seek their care outside of their home communities? Indeed, how extensive is this phenomenon? And what are some of the possible consequences for local health systems, including physicians and hospitals? Using a unique data source derived from the University of Washington's Rural Hospital Project, funded by the Kellogg Foundation, we have been able to address these questions, and, for the first time, to profile the extent and reasons for this type of travel, in six representative rural communities in Washington, Alaska, Montana, and Idaho.

NATIONALISM AND WORK: THE CASE OF PALESTINIAN LABORERS IN ISRAEL. by, Tamar Mayer, Middlebury College, Middlebury, VT. 05753.

The tension between Jews and Arabs in Israel which has occupied much of the media's attention in recent months has a long history, as do the economic, social, political and psychological interactions between the two groups. Much of this attention has focused on the rise and the intensification of Arab (Palestinian) nationalism---but it has failed, I believe, to stress sufficiently the interactions and interdependencies between Palestinians and Israeli Jews. Contrary to the popular assumption that the Arabs who interact most closely with Israel will have the least intense Palestinian nationalistic feelings, because their resistance has been compromised, this paper will try to show that the interaction between Palestinian day laborers and the Israeli labor market has indeed helped intensify Palestinian nationalistic feelings.

The paper will present preliminary results of 300 surveys which are being administered this fall among day laborers on the West Bank. It will show how consignment to *alien* status has sharpened these feelings, how unequal political, economic, and social conditions which day laborers face in the Israeli labor market may have played a role in influencing their perception of their nationalism. It will also examine the importance of other factors, such as territory, religion, Pan Arabism, political events (like the *Intifada*), and family ties to the Palestinian national feelings.

FROM GENERAL STORE TO GROCERY STORE: SPATIAL DESIGN IN THE AMERICAN SHOPKEEPER AGE

by Jim Mayo, School of Architecture and Urban Design, University of Kansas, Lawrence, Kansas 66045

The evolution from the general store to the country store was dependent upon changes in the American economy and human settlement. From early in the nation's history, the general store dominated grocery trade in small towns and the hinterlands. In the early revolutionary days of American cities, general stores did exist, although retail food trade was dominated by the public market. Whether it was the country store, a store on Main Street in a small town, or a general store in the city, the rise of the grocery store depended upon eliminating the barriers of space and introducing a money economy. Country stores were the commercial edge of the nation's frontier, but as the railroad and telegraph began to permeate the American landscape, the shopkeeper's store design and economy were greatly influenced in towns and cities. Increasingly store design was being shaped by packaged goods rather than bulk goods due to an expanding mass distribution system. In time, this system led to the downfall of the shopkeeper store system. Mass distribution expanded from product production and wholesaling to retailing.

A WEATHER-TYPE MODEL OF TEMPERATURE AND PRECIPITATION UNDER DOUBLED-CO_2 CONDITIONS

by G. J. McCabe, Jr., L. E. Hay, D. M. Wolock, and M. A. Ayers, United States Geological Survey, West Trenton, New Jersey 08628.

A regional weather-type temperature and precipitation model was developed as part of an effort to assess the effects of doubled atmospheric CO_2 on watershed runoff in the Delaware River basin. Weather types are representations of regional weather patterns that have been used to explain variability in temperature and precipitation. The model uses a semi-Markov process to simulate daily sequences of weather types, which are used to predict corresponding sequences of temperature and precipitation. Statistics derived from values of simulated temperature and precipitation for selected locations in the Delaware River basin closely match statistics calculated from observed data.

Monthly weather-type frequencies produced by general circulation model estimates for current climatic conditions closely match observed monthly frequencies of weather types for the Delaware River basin. General circulation model estimates of monthly weather-type frequencies for conditions of doubled CO_2 were used with the weather-type model to produce daily estimates of temperature and precipitation for a 30-year period. These estimates can be input to a hydrologic model to examine effects of doubled CO_2 on watershed runoff in the basin.

AN ANALYSIS OF GOLF ACCESSIBILITY IN THE PACIFIC NORTHWEST

BY R.W. McClure, Oklahoma State University, Stillwater, Oklahoma, 74078.

The Purpose of this study was to analyze the response of the golf industry in the Pacific Northwest to the problem of poor public accessibility to the sport. It was expected that a growing urban population, coupled with rising real estate costs associated with urban areas, were contributing to the accessibility problem. It was also expected that rising costs of golf course development and facility operation within urban market areas, in conjunction with the growing demand to participate in the sport, would initiate actions from the industry focussed upon meeting the market demands while increasing revenues.

A three step process was initiated to address the problem: 1) location and categorization of each golf facility construction since 1975 in the study area; 2) development of a county location quotient of golf accessibility for the study area; and 3) administration of a questionnaire to existing golf facilities within a 60 mile radius of the three largest urban centers in the study area.

The research indicated that recent constructions and golf facility adjustments were significantly targeted at meeting the demands of the market, while increasing revenues. Urban facilities were implementing strategies to increase capacity, while suburban courses exhibited a growing concern with attracting urban players through marketing schemes and facility improvement.

CANADIAN-OWNED SUBSIDIARIES IN WESTERN NEW YORK: AN ANALYSIS OF CORPORATE STRATEGY, INDUSTRY STRUCTURE, AND REGIONAL ECONOMIC IMPACT

by Alan MacPherson and James E. McConnell, Canada-United States Trade Center, Department of Geography, University at Buffalo, 419 Fronczak Hall, Buffalo, NY 14260.

This paper examines the industrial and spatial economic impact of recent Canadian direct investment in Western New York. Particular attention is focussed on the corporate motives and entry modes which characterize recent Canadian interest in this region. Survey data from a sample of Canadian-owned subsidiaries are presented which indicate a growing economic role for Canadian direct investment. The data suggest positive effects across a wide range of variables, including employment, industrial mix, technology transfer, exports, and research activity. The empirical findings are contrasted with current theoretical perspectives on the likely impact of the Canada-United States Free Trade Agreement (FTA) on crossborder investment, technology flow, trade, and employment. The paper concludes with a research prospectus for future multi-regional work on the impact of the FTA.

STABILITY AND CHANGE IN TERRITORIAL SOCIAL WELL-BEING IN SYDNEY, AUSTRALIA

by Kevin McCracken, Macquarie University, Sydney, NSW, Australia 2109.

For the quarter century following World War Two Australia was widely viewed as the "lucky country", an egalitarian society with only minor socio-economic inequalities between populations in different geographic areas. The myth of equality however, was revealed as such by a number of studies in the 1970s and early 1980s which revealed the existence of significant territorial disparities in social well-being. Most such investigations though focused on conditions at a single point in time. In this study a longitudinal perspective is adopted, examining whether socio-spatial inequalities have changed between the mid-1970s and mid-1980s. The study area chosen for investigation is Sydney, Australia's largest city.

HUMAN RESPONSE TO DROUGHT - DOMESTIC WATER MANAGEMENT ON ANTIGUA

by Stewart K. McCroskey, Department of Geography, University of Tennessee, Knoxville, TN 37996

Periodic drought affects many islands in the eastern Caribbean, particularly Antigua, a small newly independent nation which was formerly a British sugar colony. With no rivers and limited groundwater, Antigua's residents have depended mainly on rainfall for water and have been forced to adopt coping strategies in order to survive many periods of extended low rainfall.

With increasing modernization during the last 40 years, Antigua has connected its villages to its public water system, which is supplied by rainfall storage reservoirs. However, to meet the demands of increasing tourism and population pressures, a large desalination plant was installed recently. Projections have been made which assert that this system is sufficient for present needs but inadequate for future demands.

This paper traces historic trends of domestic water management on Antigua by examining strategies used prior to and after the installation of the public water supply, with a particular focus on a village on the dry eastern side of the island. Also examined are small enclaves where public water is not yet available. The documentation of past folk practices and current management strategies on the island can help many developing countries find solutions to their water problems from within their own cultures and traditions.

A ROLE FOR TRADITIONAL CRAFTS SECTORS IN AFRICA'S MODERN ECONOMIC DEVELOPMENT PLANS, by Barbara E. McDade, University of Texas, Austin, Texas 78712.

Far from being anachronisms from a past era, the traditional crafts sectors can play an effective role in the economic development process in African countries. Crafts production already provides employment and income for a sizeable proportion of the population of many countries. However, the crafts sectors' potential in the domestic economy and in the international marketplace remain largely untapped.

This paper explores some of the reasons why the traditional crafts sectors in many African countries have not been effectively supported, and addresses why and how this should change. Field work for the research was conducted in Ghana using the cane and rattan industry as the particular subject of study. Interviews were conducted with craftspersons in both rural and urban areas. Problems and prospects from their own points of view are presented and evaluated. Public and private institutions which could provide assistance were surveyed. Data from other countries is used to demonstrate the wisdom of promoting crafts in national development plans.

Interestingly, it is the craftspersons themselves who are emerging from being tradition-bound to initiatin change to adapt to a modern market and consumer tastes, while maintaining the quality and uniqueness of their products. This sector can provide improvement in income and status within the domestic economy, as well a access to the $2 billion international crafts trade.

TOURISM PLANNING IN THE ST. LAWRENCE RIVER VALLEY: ALTERNATIVE APPROACHES, by Douglas B. McDonald, Ogdensburg Bridge & Port Authority, Ogdensburg, NY 13669 and St. Lawrence University, Canton, NY 13617

The course of all aspects of economic development, including tourism, on either side of the U.S.- Canada boundary in the St. Lawrence River Valley has historically followed very different paths. In relatively remote areas such as this portion of northern New York and eastern Ontario, a sound approach to increased economic activity requires a commitment of all levels of government.

Tourism development on both sides of the boundary has had virtually the same potential physical resource to work with. However different political philosophies, policies and subsequent investment by various levels of government on either side of the boundary has led to very different planning approaches and resulted in contrasting levels of tourism opportunity.

This paper will examine the approaches to tourism development followed by governments on both sides of the border and describe the resultant set of tourism opportunities available. It will conclude that the level of tourism planning and tourism opportunities on either side of the boundary are reflective of the overall economic health of both regions.

THE AGE, ORIGIN AND PATHWAY OF SUBSURFACE STORMFLOW by J. McDonnell, Universities Space Research Association, NASA Marshall Space Flight Center, Huntsville, Alabama 35806

Despite several years of intensive research, storm runoff generation remains a controversial topic. Research in a highly responsive catchment on the West Coast of New Zealand (Maimai 8) is at the forefront of this controversy, and has yielded conflicting results regarding the importance of new water (current rainfall) versus old water (groundwater and soil water) in subsurface [illegible]. A new experiment combining tensiometric, hydrometric, chemical and stable isotope tracing techniques was used to identify the age, origin and pathways of subsurface stormflow in the Maimai 8 catchment. Eleven storm runoff events were intensively monitored during a four month period in 1987. Of the 7 events suitable for isotopic mass balance hydrograph separation, the volume fraction of groundwater, or pre-event water, averaged 91% of stormflow volumes. New water contribution could be accounted for by saturation overland flow and headwater subsurface flow. Hillslope flow was dominated by old water contributions of between 70 and 100%, which increased downslope. The soils did not show capillary-fringe phenomenon, and the volume of old water in a near-stream discharge position could not account for the old water component in channel stormflow. During monitored events, contributions from midslope and upslope hollows dominated channel stormflow response, and most of the subsurface water delivered to first order channels was via continuous pipes occurring at the soil-bedrock interface. New water isotopic signatures attained an old water status very quickly, due to mixing with a near-saturated soil matrix along crack and pipe walls. This work clearly demonstrates the value of a combined hillslope/stream oriented approach and links the mechanism of macropore flow with old water displacement.

DIVERSITY AND THE CONTRADICTIONS OF OPPRESSION: NEW APPROACHES IN FEMINIST GEOGRAPHY by Linda McDowell, Faculty of Social Sciences, The Open University, Milton Keynes MK6 2AA, England.

In our chapter in New Models in Geography Bowlby Foord, Lewis and I argued that we must move beyond the predominant emphasis on the economic in feminist geography to include an understanding of the social construction of sexuality and of cultural variations in the creation and recreation of gender relations. IN the intervening period between drafting the chapter and its publication, material changes have made us even more aware of the range of diversity encompassed by women's experience and the necessity of addressing this theoretically. Labour market restructuring in advanced capitalist societies such as the UK and USA has not only drawn in more women workers but has exacerbated differences between them, based on class and racial differences.

These dimensions of diversity - by class, place in the labour market, on the basis of sexuality, by nationality, ethnicity and culture - have challenged feminist theory, practice and politics based on an assumption of women's common oppression. Feminist geographical theory, in its variants, has been based on an assumption of male dominance and female oppression, and so focusses on the relations between women and men. But increasingly there is a need to understand the range and contradictory positions in which women stand with regard to other women. Many divisions cut across our common experience as women and so far there is no clear way of resolving them, either theoretically or in practice. Some of the implications of recognising diversity and difference for feminist geography will be addressed in the paper.

PRESENT AND PAST CLIMATIC AND HYDROLOGIC CONTEXTS OF LUNETTE/PLAYA SYSTEMS by Patricia F. McDowell, University of Oregon, Eugene, Oregon 97403.

Lunette/playa systems (LPS) are sensitive indicators of Quaternary climatic and hydrologic fluctuations. They form through deflation from a bare playa, under semiarid climates with strong seasonal contrasts in available moisture. Active and relict LPS are found today in a wide range of climatic and hydrologic settings across North America. Some have bare playas, while others have playas filled by swamps or perennial lakes, indicating major hydrologic/climatic change since formation. Where the age is known, LPS can be used to reconstruct past climatic conditions. In order to evaluate alternative paleoclimatic scenarios, the present playa status and hydrologic/climatic controls are compared with conditions necessary for lunette development. For example, northern Great Basin LPS are Holocene in age and represent a variety of local hydrologic/climatic controls. Some formed under past drier climates, while others apparently formed when high-intensity storms were more frequent. In the southwestern U.S., some LPS probably formed during Late Wisconsin time (15 to 10 kyr BP) under stronger westerlies and greater winter precipitation, but other LPS may be related to more intense monsoonal circulation during the early Holocene. The Carolina Bays of North and South Carolina are relict LPS that formed under a drier and colder Mid to Late Wisconsin climate.

A Modified Sea Breeze: The Case of the Columbia Gorge by Michael S. McGlade Arizona State University, Tempe, Arizona 85287.

During the late spring and summer months strong westerly breezes dominate the climate of the Columbia River Gorge, a gap in the Cascade Mountains between Portland and The Dalles, Oregon. This paper addresses the relationship between Gorge winds and regional pressure gradients. Data from Portland NWS and The Dalles FAA stations and surface charts were interpreted for June through August, 1989.

Local Gorge winds are linked significantly to regional pressure patterns. Two dominant wind producing synoptic regimes operate. First, short wave troughs pulse through the area and thicken the marine layer west of the Cascades, forcing a regional pressure gradient in the Gorge. Second, a modified sea breeze extends inland, and in combination with a thermal low to the east creates large but generally more localized pressure gradients. Problems of developing a wind prediction model for the Columbia Gorge are discussed.

TOWARD AN ICON-BASED GIS INTERFACE, by Matthew McGranaghan, Department of Geography, University of Hawaii, 2424 Maile Way, Honolulu, HI 96822 (matt@uhccux.uhcc.hawaii.edu).

Direct object manipulation has received much attention as a model for the design of human-computer interfaces. Only recently has the GIS community begun to explore its potential. "Intuitive" icon-based interfaces may make GIS more accessible and useful to practitioners in other disciplines, and reduce the amount of training users require, but they must be properly designed.

The presentation critically examines the utility of icon-based interfaces in GIS. In particular, desirable characteristics of icons, such as being evocative, recognizable, memorable, and conspicuous, are enumerated. These qualities operate in concert with the functions offered by a GIS, and the interaction style of the the interface, to provide a work environment. The presentation describes a design for a touch-screen based direct object manipulation GIS interface.

THE PLACE OF NATURE AND THE NATURE OF A SMALL URBAN PLACE by Patrick McGreevy, Department of Geography, Boston University, Boston, MA 02215.

In a small New York town there is a legend of a colossal cave underlying the central business district. Though generations of local people have searched in vain for an entrance to this cave, the legend persists. In this same town there is a remakable sixty-foot waterfall so hidden that 95% of the residents are unaware of its existence. In fact, it is the site of the city dump. A famous novelist who spent her girlhood here finds the most striking thing about this town, its sense of permanence, its naturalness--as if it had been here forever, so certain of its right to exist. Is the place of nature in such a town more complex than we are accustomed to think? The town was founded at a place where the Erie Canal climbs a steep escarpment. In the 1830s and 1840s, the series of locks here were considered a wonder of human achievement. Early visitors marveled at this "reverse waterfall," a place where nature seemed to do the bidding of men. Here, nature was "routed," as one visitor put it. Here, the creations of men came to be seen as natural.

HOW NOT TO DO IT: AN EXAMPLE OF LOCAL INDUSTRIAL DEVELOPMENT by John R. Mc Gregor, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana, 47809

Following acquisition of a 1,500 acre industrial site, the Vigo County, Indiana commissioners began an effort to attract industry to the site. In 1987 BASF, a West German corporation, announced that it wished to acquire the site for the purpose of developing an automotive paint plant. Upon the subsequent announcement that BASF also wished to utilize the site to incinerate and landfill toxic wastes from its plants throughout the United States, public opposition surfaced and focused in the organization Citizens for a Clean County (CCC). The conflict between competing interests polarized the county, resulted in legal challenges to the industrial development plan, and ultimately modification of the BASF development objectives. The political and economic situation which led to the local interst in attracting BASF to the site, the steps which led to the polarization of the county over BASF, the actions and reactions of opposing groups, and the implications of the conflict for further local development are considered in turn. An historical analysis is, thus, used to identify the basis of a progressive breakdown of a local development effort and the impacts of the resulting conflict.

LAND TENURE IN SOUTHEASTERN KENTUCKY: OWNERSHIP AS CONTROL, by P. McHaffie, Department of Geography, University of Kentucky, Lexington, Kentucky 40506-0027.

Land ownership, whether consisting of absolute rights to all surface and subsurface resources or rights to subsurface mineral resources, can provide the power to control many structural levels of a local economy. In a natural resource extraction economy, such as that of the Appalachian coalfield of eastern Kentucky, ownership of land resources through direct purchase of surface, subsurface, or combined rights can amount to varying degrees of control over local communities. For example, decisions regarding the development or non-development of a parcel of land (i.e. mining) can dramatically influence the employment structure, tax base, and hence resources available to communities for the provision of vital social services. Often this control may be exercised from a great distance.

This study addresses the spatial aspects of power and control through ownership of both surface and subsurface land rights in a twelve county area of southeastern Kentucky. Large owners are classed as local, in-state, and out-of-state for analytical purposes and connections are exposed between local economies and often distant landholders. The effects of this pattern of exploitation on local communities is then considered.

COMPARING AMERICAN AND CANADIAN SNOWBIRDS IN ARIZONA by Kevin E. McHugh and Robert C. Mings, Department of Geography, Arizona State University, Tempe, AZ 85287-0104

Each year hundreds of thousands of Americans and Canadians head southward in recreational vehicles (RVs) fleeing the approach of winter. Using Phoenix, Arizona as a case study, this paper compares American and Canadian seasonal migrants in terms of demographic characteristics, geographical and temporal patterns of movement, and place ties. The study is based on origin information for a random sample of 8,500 winter visitors in Phoenix RV parks, and more detailed survey data for a sample of 926 RV households.

Rates of seasonal migration to Phoenix are greatest from the states of North Dakota, South Dakota, Montana, Wyoming, and Washington, and the Canadian provinces Alberta and Saskatchewan. Rates decline regularly with distance from this northern core, and then drop conspicuously east of the Mississippi River, reflecting the influence of Florida and Texas as intervening opportunities.

RV seasonal migrants are predominantly white, middle- to upper-middle income, retired, married couples. Canadian snowbirds are slightly younger, less likely to be retired, and have slightly higher incomes than their American counterparts. Canadians have fewer Phoenix visits and shorter stays than Americans, although the differences are not dramatic. Canadians have weaker place ties in Phoenix and are much less likely to consider moving there on a more permanent basis than Americans. Maintaining eligibility for Canadian health care plans deters longer visits and more permanent relocations to the United States among older Canadians.

THE GRAVEL BARRIERS OF WASHINGTON'S PACIFIC COAST by Patrick J. McKay and Thomas A. Terich, Department of Geography and Regional Planning, Western Washington University, Bellingham, Washington 98225.

Massive gravel barriers occupy stretches of the Olympic National Park shore in Washington state. The evolution, morphology, and processes of coarse-clastic barriers are distinctive from fine-grained barriers. Overwashing of the berm crest during periods of storm wave activity causes the slow, landward migration at the three barrier systems studied. Profiling and grain size data illustrate seasonal and locational differences in morphology and processes. Driftlogs mantle the barriers and interrupt overwashing.

MEXICAN REPATRIATION FROM EL PASO DURING THE GREAT DEPRESSION by R. McKay, Clarion University of Pennsylvania, Clarion, PA 16214.

Between 1929 and 1939 at least 500,000 Mexicans and their U.S.-born children repatriated to Mexico. While the departure of Mexicans from southern California and several midwestern cities has been examined in detail, much less is known about the exodus of Mexicans from Texas during the Great Depression. Yet fully one-half of all repatriates left Texas, primarily from rural areas of Texas, but also from its cities.

This paper documents the departure of Mexicans from El Paso between 1929 and 1931. The study identified and examined similarities and differences in urban repatriation activity between southern California and the Midwest and Texas. Much of the study focuses on the kinds of repatriation pressures that were used to compel the departure of Mexicans from Texas.

PUBLIC TRANSIT SUBSIDIES: A COMPARISON OF AMERICAN AND CANADIAN POLICY

by Larry McKeown
Department of Geography, University of Toronto

A review of performance measures for the American and Canadian transit industries indicates a similar trend for much of this century with ridership reaching its zenith during the 1940s and thereafter entering into a period of gradual decline. However, a divergence between the two industries takes place during the 1970s which corresponds with the advent of operating subsidies to both transit industries. Performance measures suggest that subsidies to the Canadian transit industry are more successful in stemming ridership declines.

An obvious explanation to account for this divergence between the two industries is policy based. That is, differences in the design, implementation and evaluation of transit subsidy programs in each country may explain much of the divergence in operating performance. While this policy explanation is perhaps the most evident, policy outcomes are also accentuated by underlying differences in urban structure. This is problematic since urban structure represents, at least in the short term, an exogenous factor in the urban transportation policy process.

JAPANESE SEROW: AN EXAMPLE OF WILDLIFE MANAGEMENT USING CARTOGRAPHIC ANALYSIS

by Susanna McKnight, SUNY College of Environmental Science and Forestry, Syracuse, New York 13210.

The purpose of this study is to analyze the wildlife management conflict surrounding the Japanese serow (*Capricornis crispus*), a species of mountain goat endemic to Japan. The conflict arose when serows began to invade tree plantations and eat young saplings. Forestry interests argue that the species has become overpopulated under its protected status while conservationists argue that forestry activities (primarily plantations and clear-cutting) are encroaching upon and depleting serow habitat areas. The government is faced with making a policy decision concerning the future management of the species. Nagano Prefecture, located in the mountainous region of central Honshu Island, was chosen as the study area since it has been one of the major areas embroiled in this conflict.

This study uses the Map Analysis Package (MAP), a geographic information system, as a tool to examine the management conflict. Specifically, MAP was used to analyze distributional changes in the species and changes in habitat use, especially forests, in an effort to better understand the problem.

The results of cartographic analysis, which involves spatial modeling, indicate that the serow is moving down from high elevation, forested sites into lower elevation plantation sites. These findings are related to the fact that the forest habitat in Nagano is becoming increasingly fragmented due to expansion of road networks, increased recreational development and continued forest conversion.

WAGE RATES AND COMMUTING TIMES FOR SERVICE WORKERS

by S. McLafferty, Department of Geology and Geography, Hunter College, New York, NY 10021 and Valerie Preston, Institute for Social Research, York University, North York, Ontario N3J 1P3.

Geographers have recently drawn attention to spatial variations in wages that complicate well known sectoral and occupational differences. Recent theories suggest that spatial variation in wage rates within metropolitan areas results from mismatches between local labor demand and supply. As local labor demand rises, firms raise wage rates to attract workers from larger laborsheds, thereby creating a positive association between wage rates and average commuting times. We examine this hypothesis for a large sample of service workers from two service industries in the New York metropolitan area. The industries are: advanced corporate services, a producer service industry concentrated in Manhattan, and retailing, a spatially dispersed consumer service industry.

For both industries, we find the highest wage rates in the central city where labor demand exceeds supply and long commuting times prevail. Lower wage rates are typically associated with shorter commuting times and more equality of local labor demand and supply. Other factors, such as gender and race, are also important. The results reflect the extent to which service firms can and do locate in relation to particular labor forces.

INTEGRATING EXISTING RULE BASES WITHIN CONCEPTUAL FRAMEWORKS OF NUMERICAL GENERALIZATION

by Robert B. McMaster, Department of Geography, Syracuse University, Syracuse, NY 13244.

In order for the development of fully operational automated cartographic generalization software, detailed rule bases must be developed within the structure of existing conceptual frameworks. One such conceptual framework, based on a logical hierarchy of generalization operators, identifies two distinctly different approaches: cartographical and attribute generalization. Using this framework, the application of an existing rule base is evaluated; the rule base is designed for purposes of automated map production.

Particular attention is focused on the cartographic logic of the rules and their potential for applications in digital production. As an example, one existing set of rules state, "A. Features such as tanks, silos, exposed wrecks and buildings are significant, particularly in places of sparse culture. B. Only SMC 1,2,or 3 structures will be selected for portrayal. C. If structures are too densely spaced to portray as individual features, a representative pattern will be selected for portrayal." Such rules relate directly to the generalization operator known as amalgamation. If established within the framework of existing generalization operators, it is apparent that the application of such existing rules bases could greatly increase the potential for the development of near fully-automated generalization systems.

INDIAN RESERVED WATER RIGHTS AND WATER MARKETING: SOME EMERGING ISSUES.

by M. McNally, Dept. of Management and Economics, Eastern Montana College, Billings, MT 59101.

Water marketing is assuming increasing importance to Western states and localities. In addition, the right of Indian tribes to market their reserved rights has emerged as a pivotal issue in settling outstanding Winters' Rights claims. However, the dimensions and significance of this right remain largely unexplored. Drawing on specific settlements involving Indian reserved water rights, this paper will examine the emerging realities of tribal water marketing activities. It is argued that tribal marketing authority may not be a panacea for reservation development nor the threat to non-Indian water users that many expected. Instead, continued legal, political and economic innovations are required to give substance to the concept of tribal marketing, and to allow Tribes and States to explore mutually beneficial marketing interests.

U.S. FOREIGN DIRECT INVESTMENT IN CANADA

by Rod B. McNaughton, The University of Lethbridge, Lethbridge, Alberta T1K 3M4.

The U.S. is the most important foreign investor in Canada. The Free Trade Agreement (FTA) between Canada and the U.S. has renewed concern for Canadian corporate sovereignty. Some observers suggest that less restrictive review thresholds will result in increased U.S. ownership levels. Others point to the net decline in U.S. control of Canadian firms, and the rise of large Canadian MNCs that are active in the U.S. economy. Data obtained from Investment Canada describe the spatial, temporal, and industrial sector patterns of U.S. FDI since the second quarter of 1985. This establishes a baseline by which future investment can be compared as review thresholds are gradually raised through 1991. The spatial pattern of U.S. investment is focused on Canada's economic heartland, and is independent of temporal variations in investment level. Sectoral investment is also concentrated, and time independent. These observations are interpreted in the context of oligopolistic reaction theory which argues that firms in particular industries follow rival firms in undertaking FDI, creating spatial and sectoral clusters of investment. This perspective suggests it is unlikely U.S. FDI will significantly expand into more sensitive peripheral regional economies, or diversify into additional sectors. Thus, the raising of review thresholds should have little impact on Canadian corporate sovereignty.

INTERTEMPORAL TIME DEPENDENCIES IN LONGITUDINAL CONSUMER PANEL DATA by Fiona McNeill, Department of Geography, McMaster University, Hamilton, Ontario, L8S 4K1 [MCNEILLF@MCMASTER.CA]

Disaggregate models of consumer purchasing behaviour reflect a likewise trend in advertising and marketing research where mass-marketing strategies are giving way to 'target' marketing of subpopulations. One limitation to date of disaggregate studies is a lack of data at the individual scale and in particular, repeat observation on each individual. This paper uses a longitudinal panel data set containing records of individual purchases made over a 24 week period.

Earlier analysis, particularly in the marketing research and the geographical literature, has used 'simple' distributional models, such as the "NBD" and the "Dirichlet", which tend to involve some degree of aggrogation, particularly in the time dimension. Furthermore, with one notable exception (Davies & Pickles, 1987), current applied models of shopping behaviour in geography have neglected the influence of state dependence, where state dependence is defined as the influence of an individuals prior (purchasing) event history on the current probability of an event.

This analysis examines state dependence at a temporally disaggregate level, the scale of repeat shopping events, and assesses the influence and nature of intertemporal time dependencies in individual spatial choice processes.

THE BIOREGIONAL CONCEPT AND ITS APPLICATION TO THE STUDY OF BALI, INDONESIA. By W. Donald McTaggart, Department of Geography, Arizona State University, Tempe, AZ 85287.

The concept of the bioregion has been treated in some detail by Kirkpatrick Sale. Using as headings the factors of scale, economy, polity, and organization, he presents an outline of a bioregional approach. This approach is partly analytic/synthetic, and partly normative, in that it proposes standards of community ecological behavior by which a region may be judged. This approach is then applied to a study of the geography of the island of Bali, Indonesia. It will be argued that in terms of scale Bali provides a case of a bioregional entity, distinct from the larger Indonesian unit in which it is contained; its economy is dualistic, orientated partly towards local concerns and partly towards world markets; its polity places it in conflict with national goals and aspirations for the nation state of which it is a part; and in terms of organization it has retained a high degree of cultural autonomy, a factor which helps to explain its actual and potential conflicts with the national government. This account suggests policy initiatives to alleviate these conflicts.

COMPARING SPECIFIC ENVIRONMENTS OF RISK USING GIS by M.S. Meade and W.M. Gesler, Department of Geography, University of North Carolina, Chapel Hill, North Carolina 27599-3220.

The etiology of the Enigma Area of high stroke and hypertension in the Southeastern coastal plain is unknown. This study surveyed two hundred households in twenty clusters in census tracts whose cardiovascular conditions were well or poorly predicted by socioeconomic models in an attempt to identify possible new risk factors. Data were collected on such dimensions as household demography and socioeconomic characteristics, daily mobility patterns, diet, health care, residential history, and blood pressure. Social activity areas were determined and specified by elliptical cells for each cluster. The cluster household locations and activity areas were then compared and analyzed with regard to several scales of data: socioeconomic, demographic, stroke and blood pressure data by census tract; household socioeconomic, demographic, blood pressure, and other data; metropolitan landuse for types of residential housing, green space, industrial, commercial, and water coverage; and industrial location. ARC/INFO was used to overlay and compare these surfaces. Polygon unions were used to determine weighted averages of "exposure" to physical and social environmental types for each cluster. Distance from households and activity areas to types of industries by size of employment were compared. This methodology demonstrated its usefullness for defining and assessing the exposure of a mobile, and not merely residential, population to pollution sources, neighborhood characteristics, or potentially traffic, spills, storms, and other hazards.

THE YUKON LAND CLAIMS AGREEMENT: NEGOTIATING A FINAL SETTLEMENT by Anne Meaney-Leckie, State University of New York College at Geneseo, Geneseo, New York 14454.

In a 1973 decision the Canadian Supreme Court recognized that aboriginal title exists in Canadian law. Since that time native groups have asserted their right of title and sought comprehensive land claim settlements with the various levels of government.

On May 29, 1989, after 15 years of talks, the Council for Yukon Indians signed an agreement-in-principle to negotiate land claims with the Federal and Territorial governments. The intent of these negotiations is to resolve distinct legal claims held by the Yukon Indian people. These include, claims to land, both in terms of aboriginal title and due compensation, as well as claims to self government, tax exemption and wildlife harvesting rights.

All parties concerned agree that only legal certainty of land and resource ownership will allow economic and political development to occur in the North. However, conflicting views on the ultimate use of the land, and a government concern that all Yukoners receive equal treatment, leaves the parties at odds as to how to accomplish this.

This paper provides a background to the negotiations currently taking place in the Yukon and discusses the impact the agreement-in-principle will have on land use and development opportunities in the region. This is accomplished by presenting a literature review of the processes, followed by an analysis of the impacts and a discussion of land use and development options. It is anticipated that this analysis will contribute to a greater understanding of the land claims issue in Canada's north.

REGIONAL CLIMATE MODELING OF THE GREAT LAKES BASIN AND CLIMATE CHANGE SCENARIO DEVELOPMENT FOR IMPACTS ASSESSMENT by Linda O. Mearns and Filippo Giorgi, National Center for Atmospheric Research, Boulder, CO 80307.

One of the most significant factors which limits progress in the determination of the specific impacts of climate change on relevant earth systems is the lack of precise and accurate scenarios of regional climate change. This paper reports on the development of a coupled limited area model (LAM) general circulation model (GCM) system for the Great Lakes Region which will be used to form a detailed regional scenario of climate change for the area. In this system the lateral boundary conditions and initial conditions needed to drive the LAM are provided by the output of a GCM simulation. The NCAR CCM1 (National Center for Atmospheric Research Community Climate Model) and the MM4 (Penn State/NCAR Mesoscale Model) are the models used to form the coupled system. The strength of the LAM-GCM system lies in its ability to model the effects of local surface conditions, such as topography, bodies of water, and vegetation, on the regional climate. The LAM can represent these conditions with a much finer spatial resolution than can a GCM. In this regard our project can be viewed as a means of providing some empirical verification of the "weak" Gaia hypothesis. We will also present validation results from an earlier experiment in the Western U.S., which demonstrate the coupled system's improvements over lower resolution simulations by the GCM alone to simulate the regional climate on fine spatial and temporal scales.

AN EXAMINATION OF THE VARIABILITY OF DAMAGE POTENTIAL WITHIN THE 100 YEAR FLOODPLAIN OF WILKES BARRE, PENNSYLVANIA, by Omie E. Medford, Geography Department, Colgate University, Hamilton, New York 13346.

The purpose of this study is to examine the variability of potential damage within the 100 year floodplain among residential structures in Wilkes Barre, Pennsylvania, as a means of examining patterns of risk and socio-economic impact. This research is based on the premise that the effects of flooding are not uniform across a floodplain due to the differences in physical characteristics and the intensity of human occupancy. The potential damage to an area from a flood will depend on the variability of the physical and human landscapes. This variability is particularly obvious amoung residential structures. The results of this study show that areas of the floodplain classified by elevation are distinct based on zoning designation, mean value of the houses per block, the percent of one unit houses per block, the number of feet between the first floor and the ground surface of each structure, and the assessed value of the house.

SOCIAL INEQUALITY AND POPULATION DYNAMICS IN THE USSR: A REGIONAL PORTRAIT

by Olga L. Medvedkov, Wittenberg University,
Springfield, OH, 45501 and Mershon Center, OSU,
Columbus, OH 43210

A model of 5 societal life support systems, suggested by Human Ecology, helps in identifying 35 data items for scaling 114 Soviet regions (on oblast level) by well-being, WB. Two kinds of resources are among the items: those not in making any longer (land, climate), and those absorbed increasingly by the empire core for its command functions (higher order jobs and services). Numeric Taxonomy tools permit to group regions into 11 clusters of WB similarity. Applicability of a Likert scale to show a composite WB score for the clusters is confirmed. Maps of WB are compared, in validity tests, to maps of population change in 1979-89. Regions of lowest WB have signs of absolute and relative depopulation. In 1979-89 they have growth rates of urbanite numbers down from the national average. The South of Moslem cultural background shifts to the low end of WB scale if one removes climate components from the scale.

A dichotomy of poor/better-off regions shows that an exodus from poor areas differentiates the Russian ethnic group into movers and stayers. Imperial privileges help mainly the movers in competing for jobs in the better-off regions. It adds fuel to regional conflicts which currently endanger state stability and internal peace in the USSR.

REGIONAL GEOGRAPHY OF BACKWARDNESS IN THE SOVIET UNION

by Yuri Medvedkov, Ohio State University, Columbus OH,
43210

The author ranks 114 regions of oblast level by Y - per capita consumption, the sum of consumer sales, paid services, new housing cost (1986). Levels of Y follow close those of real per capita income in the USSR (Hewett, 1988). Moscow oblast has the top Y = 2115 RR, and Moslem regions share 7 lowest places, Tajikistan being at the bottom (Y=724 RR). The five groups of equal membership, Y-quantiles, have the border cases (1989 population): Moscow--Omsk (63M), Amur-Zaporozhye (50M), Krasnodar-Astrakhan (50M), Lipetsk--Trans-Carpathia (42MO, Tambov-Tajikistan (79M). Structural constrains contribute to backwardness, as shown by Y weaknesses in deflating labor shares: A - extracting industries, M - transformative industries. The fit of LN(Y) to LN(A) or LN(M) much improves from adding a drift parameter, D, to Taylor's model of economic development. The expansion method (Pandit, Casetti, 1989, AAAG) permits to see that D = [density of urban networks] has a particular importance in the Russian Federation. The response of LN(A) on LN(Y) in its 71 regions steps up as soon as LN(Y) is joined by such D. Poor networks discourage shifts A ->M, A->S, M->S. The elasticity of S keeps barely above that of A and M. An extreme backwardness, A > M, is a case of peripheral colonies: Chita, Cechenia, Kalmykia, Komi, Magadan. Murman, Sakhalin, Tymen, Tuva, Yakutiya.

REVISITING PEIRCE LEWIS' 1965 CARTOGRAPHIC ANALYSIS OF ELECTORAL GEOGRAPHY IN LIGHT OF CURRENT GIS TECHNOLOGY

by Grady B. Meehan, Department of Geography, Salisbury
State University, Salisbury, Maryland 21801

Applications of geographic information systems technology have multiplied rapidly in the past decade and will likely have a major impact on geographic research. The reexamination of an earlier geographic study will attempt to link past with present and future geographic research methodologies. Lewis employed cartographic analysis as the methodological approach in his 1965 article on the electoral geography of Flint, Michigan. He used maps based on data representing two different geographic zoning systems, city blocks and election districts. Data integration was accomplished by interpolating the map of election returns to an isopleth surface that was overlaid on a choropleth map for visual analysis. Lewis' methodological arguments in support of the map overlay approach applied logic similiar to that incorporated in contemporary geographic information systems. Since that time, research in overlaying maps with unlike zoning systems and spatial interpolation methods have facilitated the automation of this laborious manual procedure.

LAND ALONG THE LINE: THE VERMONT-QUEBEC BORDER

by Harold A. Meeks, The University of Vermont, Burlington, VT 05405

For over 80 years between the Treaty of Paris, 1763, and the Webster-Ashburton Treaty of 1842, much of the U.S.-Canadian boundary between the Atlantic and the St. Lawrence River was indefinite and in dispute.

Original charters specified that the northern border of the then Province of New York (which included the future State of Vermont), was to be 45° North Latitude. Surveyors in 1770-1771 erroneously located this line up to a mile and half north of where it was supposed to be. A "no man's land" existed for many years.

This paper is a brief survey of this borderland with emphasis on the history, marking and land use along the Vermont-Quebec portion of the line. Ground and air photography clearly show land use and land pattern differences. Several unique boundary characteristics are illustrated.

ANNUAL RING RESPONSE TO CLIMATE BY GLAZE-ICE DAMAGED VERSUS UNDAMAGED PINES

by David J. Travis and V. Meentemeyer. University of Georgia. Athens. Georgia. 30602

It is the purpose of this study to determine the degree to which glaze-ice storms influence ring increments in healthy loblolly and shortleaf pine trees. In addition we demonstrate a unique ring response to temperature and precipitation by trees permanently stressed and damaged by ice storms. For one shortleaf and two loblolly pine stands in the Southern Appalachian Piedmont. data on annual ring increments of healthy trees were collected. Traditional dendroclimatological methods were used to create models with and without data on ice storm dates (timing) and ice accumulation (severity). Storm severity significantly increased the R2 values for loblolly stands from 0.35 to 0.46 and from 0.39 to 0.49. For the shortleaf stand. the date of a storm increased the R2 from 0.25 to 0.43. Early spring storms produce the largest reductions in ring increments. In one of the loblolly stands. healthy trees were paired with trees showing crowns broken by glaze ice. The best temperature and precipitation model for the healthy trees produced an R2 of 0.35. but for the stressed trees the R2 was significantly higher (0.45). Furthermore the stressed trees responded primarily to temperature. while the healthy trees responded primarily to precipitation.

SCALING SOLID COLOR OVERLAPPING GRADUATED CIRCLES

by Bruce W. Meier and Cyrus W. Young, Department of Geography, Miami University, Oxford, Ohio 45056

The problem of scaling the graduated circle symbol to correctly represent quantities has received considerable attention. The perception of quantities presented by clusters of circles, as often occurs in real life mapping, has been the subject of much less investigation. Clusters present at least two perceptual problems. One is a question of will "the sum of parts appear to equal the whole", such as when a symbol that represents a metropolitan area is compared to the city-plus-suburbs of the same place. The second involves comparing circles, one to another, within the city-plus-suburbs cluster.

This investigation is concerned with solid color rather than transparent symbols. The solid design results in a cluster in which the smaller circles "cut out" part of the larger circle(s) beneath them. Previous research shows a strong relationship between the amount of overlap and error in estimating the quantity represented. In the parts-compared-to-the-whole-case, clusters tend to look smaller than their numerically equivalent whole. This study presents a method by which overlapped circles can be scaled so that their visible area equals that if not overlapped. It will also present the results of a psychophysical test designed to measure the success of the method.

REGIONALISATION, CENTRALISATION AND AUTARCHY IN ECONOMIC DEVELOPMENT: EXAMPLES FROM EASTERN ARABIA AND ELSEWHERE, by Alexander Melamid, New York University, New York, NY 10003.

Economic Development implies improvements of transportation as well as planning or co-ordination which requires centralisation of direction. Both features affect the structure and status of regions. Better transportation reduces regional autarchy but can redistribute among classes of people thus affecting regional characteristics. Recent development in Oman, the United Arab Emirates, and the two Yemens clearly reflect these regional and centralisation patterns which are confirmed by studies in Africa and India.

ENVIRONMENTAL AND ENGINEERING POLICIES INFLUENCING CONSTRUCTION OF TIDAL SURGE BARRIERS IN THE UNITED STATES, EUROPE AND ASIA by R. Menzies, U.S. Army Corps of Engineers, Savannah, Georgia 31402.

The purpose of this study was to identify storm surge barriers by location and type, and also determine the conditions which influenced their deployment. Information was obtained through site visits and a survey of engineering literature.

An inventory of planned or recently constructed storm tide barriers indicates that these large scale approaches to storm tide protection are more readily accepted in European and Asian countries with small land areas, high population densities and intense land use. Several large scale tidal defense works were built in the United States prior to 1970. After 1970, combined economic and environmental concerns discouraged such projects. Currently in the United States, storm tide defense strategies emphasize evacuating people, limiting or excluding use of lowland areas, and elevating or otherwise floodproofing structures and facilities.

Although relatively expensive, the open case storm surge barrier is gaining favor in Europe as an environmentally acceptable alternative to coastal dams and dikes.

Storm surge barriers and other high cost coastal defenses are usually not built on the basis of a potential threat, but only after storm tides have caused great destruction and loss of life.

AMERICAN AND CANADIAN CITIES: NEAR NEIGHBOURS BUT WORLDS APART? by John Mercer, Department of Geography, University of Victoria, Victoria, B.C., Canada, V8W 2Y2.

This paper provides a larger context for considering the management of Toronto's growth by focussing on some salient differences and commonalities between American and Canadian cities. The products of capitalism, cities in both Canada and America bear witness to a largely private development process and to social relations and structures marked by profound inequalities. They are open systems, being affected by such common processes as "restructuring" or international migration. The degree to which such processes are regulated and inequalities ameliorated (functions of the state) varies cross-nationally but also within each national territory, the provinces and states being crucial contexts in quite different federal systems of government.

Several notable cross-national urban differences have been documented through comparative empirical analyses using metropolitan area data from the 1970s and 1980s. These include differences in metropolitan growth trends with Canadian cities exhibiting less extremes, either of gain or loss; contrasting social compositional characteristics with, for example, proportionately greater foreign born populations in urban Canada; more compact Canadian cities with higher density housing stocks, better served by public transportation less fragmented geographic structures of local government and greater amounts of integration in metropolitan governance; a higher degree of livability in Canadian central cities.

A model of public and private cities is presented. Canadian cities are argued to be appropriately characterised as public but with a clear private aspect, whereas American cities are more private in nature but with significant public presences.

AN EXPERT SYSTEMS APPROACH TO UPDATING LAND USE/LAND COVER MAPS by James W. Merchant, Center for Advanced Land Management Information Technologies, Conservation and Survey Division, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, Lincoln, NE 68588-0517.

Remotely sensed data can be employed to detect land surface changes potentially useful for updating land use and land cover (LULC) maps such as those produced by the U.S. Geological Survey (USGS). Characterization and classification of LULC change should be based upon logical interpretation of observed surface changes in the context of a geographic setting that makes certain possible outcomes more likely than others. A method to improve change analyses founded upon digital image data processing is proposed. Change is assessed via both analysis of spectral data and via reasoning based upon antecedent conditions, expert knowledge and ancillary data. A GIS, linked to an expert system and to the digital analysis system is used to store, register and process the data. Tests conducted with Landsat data acquired over Nebraska and Kansas test sites demonstrate that the proposed approach performs well in updating USGS 1:250,000 LULC maps.

THRESHOLD CONDITIONS FOR RILL EROSION ON AGRICULTURAL SOILS by Wolfgang Merz, Department of Geography, University of Toronto, Toronto, Ontario, M5S 1A1, and R.B. Bryan, Soil Erosion Laboratory, University of Toronto (Scarborough), Ontario M1C 1A4.

Plot-sized rainfall simulation experiments were conducted on two agricultural soils in Southern Ontario and in the flume of the Scarborough Campus Soil Erosion Laboratory. During the experiments, soil moisture, bulk density, shear strength and the development of rills were monitored. Runoff rates and sediment concentrations were determined at the bottom of the plot. Estimates of the hydraulic conditions were obtained by means of rulers and dye tracing.

In both the field and flume experiments shear strength was negatively related with gravimetric soil moisture content and erosion rates. Soil loss and the extent of incision were positively related to shear velocity and unit stream power. Estimated critical shear velocities were higher than those reported by other workers. This is attributed to the use of cohesive sediments and rough surfaces.

This study shows that the transition from sheet flow to the more erosive rill flow is linked to critical shear velocities and thus confirms the findings of other scholars.

CROSSBORDER ENVIRONMENTAL MANAGEMENT: THE ST. CROIX WATERWAY by Peter H. Meserve, Northwest Missouri State University, Maryville, Missouri 64468.

Cooperation between the governments of Maine and New Brunswick over developing the resources of the St. Croix River has been limited historically but is a major goal for the 1990's. The St. Croix International Waterway Commission was jointly created to devise a plan by June, 1990, on managing the recreational use of the waterway. Such cooperation is part of a larger trend in cross-border exchanges and activities by states and provinces. It also reflects recent changes in the economic base of this boundary region from extractive to service industry. The redefinition of resources in this waterway to emphasize historical, educational, and recreational values has followed an increase in tourism. The political partition of the international boundary is seen in this new economic perspective as detracting from effective resource utilization by each side. Joint planning and development by the state and province, if successful in this venture, will likely lead to future cooperative efforts.

SPATIAL PATTERN OF ENVIRONMENTAL USE AT CHIMKHOLA, NEPAL by John J. Metz, Department of Geography, University of Wisconsin, Whitewater, WI. 53190.

The Magar community of Chimkhola in western Nepal controls and uses over 30 km^2 of agricultural fields, forests, and alpine pastures on the southeastern flank of Dhaulagiri Himal. Agriculture is the mainstay of subsistence at Chimkhola, and farmers maintain livestock primarily to fertilize fields. The villagers have built rainfed agricultural terraces on north, west, and south facing slopes between 1500 and 2500 m. They aggregate fields by aspect into three main groups, each of which is in a different year of a three year rotation cycle, and into 7 subgroups, which are the basic units of the rotation. Prior to planting, households take livestock onto their fields for one to several weeks so that the manure and urine fall directly on the soil. When all fields are planted, herders move their animals into the forest where they supplement naturally available feed with fodder cut from forest trees. Each year has a summer and winter cropping season, so livestock are moved frequently from field to field to forest in a pattern decided by village leaders at open meetings. This patterned movement of livestock herds organizes and coordinates all aspects of village life and allows the people of Chimkhola to utilize the wide range of resources available to them.

REGIONAL AGRICULTURAL DEVELOPMENT AND URBAN-INDUSTRIAL GROWTH: THE INSTITUTIONAL CONTEXT by David R. Meyer, Brown University, Providence, RI 02912.

Agricultural development and urban-regional industrial growth are mutually reinforcing when an institutional matrix exists that includes a market price system, a marketing and distribution system in private hands, a local and intra-regional transportation system under intraregional political control, a private financial system, private property rights, and a political system not dominated by one small elite group, especially landed elites. Newly industrializing nations in East Asia have selected components of this matrix which have been important contributors to their successful industrialization, but the absence of some components have contributed to retardation in their growth. Although these institutions do not guarantee long-term developmental success in a global industrial economy, they provide the base for the early stages of regional development, which many less-developed nations have still failed to establish.

SPATIAL STRUCTURES AND VISUAL ELEMENTS OF A GERMAN COMMON LANDSCAPE by Douglas K. Meyer, Eastern Illinois University, Charleston, Illinois 61920.

German ethnic islands in the heartland of America are culturally and architecturally distinctive visual landscapes. By late nineteenth century a quintessential common landscape of text, context, and meaning that "looked German" was being nurtured in rural communities and urban neighborhoods. German common landscapes are identified by visual cues of orderliness, simplicity, conformity, and persistence. My purpose is to briefly examine the spatial structures and visual elements of a German vernacular landscape that emerged in market centers and their agrarian hinterlands in southwestern Illinois (St. Louis Metro East). Common house types and visual elements of landscape symbolize implicit cognitive statements of past ideas of ordinary people, everyday life, and traditional German landscape scribing. The study area represents perhaps the largest concentration of nineteenth century German-American, double-pile cottage vernacular architecture in the eastern United States. Individually, the small, brick cottages are not culturally nor architecturally significant. Aggregated they are extremely meaningful in their collective architectural design, quality, heritage, and preservation and as containers of social and cultural life.

NUTRITION SERVICE AVAILABILITY: A POTENTIAL MODEL by J. Meyer and E. Cromley, University of Connecticut, Storrs, Connecticut 06269-2148.

Availability, defined as a measure of the supply of services relative to the needs in the community, is critical to older people, particularly the socially isolated and frail elderly who are less mobile than most of the population. This research uses a potential model to examine variation in the availability of nutrition services in Connecticut by considering both the capacity and location of nutrition sites and the capacity and location of demand for these services. The model thus does not constrain older people to meet their demand within their towns' borders. Several measures of availability are calculated, using different beta values to represent varying levels of mobility for the total older population and for targeted groups of older people. Such models can be used to evaluate the current distribution of nutrition sites and suggest redistribution of sites for more optimum availability. Availability measures can also be used as independent variables in analyses of variation in actual utilization of services; for example, among towns in Connecticut, utilization rates of nutrition services vary significantly with rural areas having the highest rates of utilization.

THE WHITE MOUNTAINS, 1890-1920

William B. Meyer
Graduate School of Geography, Clark University

Some issues in the concept of environmental crisis zones can be clarified by studies from the past. The successful campaign to secure federal protection of the White Mountain forests in New Hampshire in the early twentieth century illustrates factors of intellectual and institutional context in the perception and definition of environmental crisis. Such driving forces of change as demand for timber and the structure of state taxation caused severe deforestation in the region beginning in the latter decades of the nineteenth century. Claims of wider spillover effects, rooted in popular beliefs of the period, ascribed to the mountain forest an important role in protecting climate, health, and especially streamflow in several interstate river basins; these were used to justify national, rather than state or regional, intervention and to make a case for its legality through the commerce clause of the federal constitution. Yet while the rhetoric of crisis, particularly the link between upstream deforestation and devastating flood damage below, was promoted by several government agencies, it was sharply attacked by others, notably the Weather Bureau and the Army Corps of Engineers, whose institutional evolution had led them towards different assumptions about human impact as compared to natural fluctuation.

ENVIRONMENTAL ASPECTS OF RESORT EVOLUTION: APPLICABILITY OF RESORT CYCLE MODELS by Klaus J. Meyer-Arendt, Mississippi State University, Mississippi State, Mississippi 39762

Conceptual models of resort evolution have been used to document patterns of tourist flows, social and economic impacts, and changes in resort morphology. However, resort cycle models have been less proficient at correlating interactions between recreationists and their physical environment. Tourism impacts upon the environment are most often perceived as being linear relationships, and higher levels of tourism development are generally correlated to greater negative environmental impacts. Wolfe's "Ellis curve" suggests early positive environmental impacts of tourism development followed by rapid environmental degradation as tourism expands.

Documentation of Gulf of Mexico seaside resort evolution by application of a modified Butler S-curve model reveals a more complex human-environment relationship. Initial tourism development is usually accompanied by minimal environmental disturbance. Subsequent rapid development is accompanied by the greatest negative impacts. During more advanced stages of the resort cycle, perceptions of environment degradation lead to increasing environmental preservation. The impact of hurricanes upon resort development also displays a correlation with stage of evolution, although additional variables limit the accuracy of predicting resort response to storm events. Despite resort variations, resort cycle models are useful in evaluating past environmental impacts and planning for more environmentally sound development.

EARTHQUAKE INFORMATION EXCHANGE IN BRITISH COLUMBIA AND WASHINGTON STATE by Sarah Michaels, University of Colorado, Boulder, Colorado 80309.

The subduction of the Juan de Fuca Plate beneath the North America Plate is believed directly or indirectly to cause most of the earthquakes in British Columbia and Washington State. To address these hazards issue networks have emerged in both jurisdictions.

Issue networks consist of people who know each other because of their common concern about specific issues. Participants in issue networks are committed to becoming knowledgeable and to taking action on particular policy issues. Members of issue networks create shared knowledge bases, refine public policy issues, debate evidence and work out alternative options. Issue networks are useful to investigate because they provide insight into how and why people coalesce around issues, such as earthquakes, which are not highly salient to a wider society.

The British Columbia and Washington State earthquake issue networks overlap because of the common earthquake threat and other existing linkages. In depth interviewing reveals that earthquake issue networks in both jurisdictions are similar in membership and in patterns of information dissemination. While participants constantly move in and out of issue networks, those who do make an extended commitment are those able to derive financial or professional reward for their involvement. New, earthquake specific, lines of communication develop only to supplement existing, non earthquake-specific channels.

LARGE-SCALE PRECIPITATION VARIABILITY OVER WESTERN NORTH AMERICA by Joel Michaelsen and Laura Haston, University of California, Santa Barbara CA 93106

For this study precipitation records from a large number of stations spread over western United States have been assembled and carefully screened for discontinuities and errors. Multivariate frequency domain time-series techniques have been employed to identify and isolate characteristic time and spatial scales of variability during the 20th century. Using this approach, different spatial patterns can be identified at different time scales, and standing waves can be distinguished from traveling waves. Spatial and temporal patterns have been analyzed for three time scales showing large amounts of variability: 1) A 2.1 year scale which is linked to the quasibiennial oscillation; 2) A 5-8 year scale which is loosely tied to El Nino; and 3) A rough 16-20 year scale of uncertain origin.

In addition, the data have been examined for any evidence of secular change which might be related to the 20th century Northern Hemisphere warming. After the station data have been corrected for discontinuities very little evidence of regional or large-scale trends remains. It appears, therefore that the 20th century warming has not produced any significant overall trends in precipitation in the western United States.

TIME-GEOGRAPHY AT THE MICRO SCALE OF HOUSING by William Michelson, Centre for Urban & Community Studies, University of Toronto, Toronto, Ontario, Canada M5S 1A1.

The time-geographic perspective is extended to the analysis of everyday behaviors within the opportunities and costraints of residential complexes. Several goals of recent Swedish housing initiatives are conceptualized in behavioral terms. The paper describes a study of eight Swedish housing projects, including various experimental projects with intended behavioral outcomes and control areas with more conventional characteristics. Methods include self-administered, pre-coded time-budgets from all family members, which provide for considerable detail about use of common spaces within the residential complexes. These data are supplemented by conventional survey protocols on residential mobility and subjective considerations, together with systematic observation of social contact in common spaces. Results indicate variation in behavior reflecting not only the contexts involved but the self-selection of residents to these contexts.

PRECIPITATION VARIABILITY IN THE SOUTHEAST UNITED STATES AND OCEAN-ATMOSPHERE INTERACTIONS by Thomas B. Micuda, Department of Geography, Indiana University, Bloomington, IN 47405.

This study examines the association between sea surface temperatures (SSTs) in the Gulf of Mexico and the tropical Pacific and Atlantic Oceans with precipitation variability in the Southeast United States between 1947 and 1986. An obliquely rotated principal component analysis is applied to seasonal Palmer Drought Severity Index (PDSI) data for this region. The climatic regions identified from the principal component analysis are broadly similar across seasons, but the key divisions having the highest factor scores within each region change inter-seasonally. Years of extreme positive and negative departures of the monthly PDSI in each division are correlated with seasonal SST anomalies averaged over 10° latitude/10° longitude units for the three oceanic regions Results from the Pacific Ocean reveal some concurrent and lag associations between seasonal SST anomalies and the monthly PDSI, especially for the Gulf coastal climatic divisions. However, the correlations are charcterized by considerable month-to-month variability, and do not reveal a strong association between extreme departures of the PDSI in the Southeast United States and SSTs in the tropical eastern Pacific Ocean. Variability of the PDSI in the Southeast United States appears better correlated with more localized ocean-atmosphere forcing in the Gulf of Mexico and the Atlantic Ocean.

FLOW PATTERNS, VALLEY GEOMETRY, AND SPATIAL DISTRIBUTION OF FLOOD-GENERATED EROSION FEATURES by A.J. Miller, Department of Geography, University of Maryland Baltimore County, Baltimore, Maryland 21228.

Patterns of erosion observed following the flood of November 1985 in eastern West Virginia indicate that fluvial impacts are heavily influenced by local boundary conditions. Flow patterns are affected by shape and orientation of the valley walls, the spatial arrangement of geomorphic surfaces with differing elevations above the channel bed, plan form and orientation of the river channel with respect to the valley, and locations of patches of vegetation and artificial structures on the valley floor.

We conducted field surveys in the South Branch Potomac River Basin along several valley reaches where characteristic erosion features were observed. HEC-2 (Hydrologic Engineering Center, 1982) a one-dimensional step-backwater model, was used to predict longitudinal variations in cross-section average velocity, shear stress, and unit stream power; FESWMS-2DH (Froehlich, 1988), a vertically-averaged two-dimensional finite-element model, was used to predict both lateral and longitudinal variations in velocity, depth, and basal shear stress. Comparison of the spatial patterns of predicted hydraulic parameters and of flood-generated erosion features is expected to yield estimates of threshold conditions required for floodplain erosion. Preliminary results suggest that the most dramatic erosion occurs at the exit from a valley constriction, where unit stream power may exceed 1000 W/m^2 and basal shear stress on the floodplain may attain values of several hundred N/m^2. In addition we are using the models to investigate the sensitivity of floodplain flow patterns to subtle variations in boundary conditions.

HABERMAS, MODERNITY AND CRITICAL HUMAN GEOGRAPHY by Byron Miller, Department of Geography, University of Minnesota, Minneapolis, MN 55455.

The postmodernism debate in geography raises a number of fundamental philosophical issues. The basic tenants of modernity - the progressive universalization of reason, the belief in progress, the plausibility of metatheories, and the decidability of theoretical claims - have been cast in doubt or rejected by postmodernists. Recognizing the centrality of language, postmodernists tend to embrace a relativism in which incommensurable language games and the nonself-validating nature of text preclude the ultimate decidability of conflicting claims. While rooted in the conditions of our postmodern world, such relativism is not only questionable, it leaves us little on which to base an emancipatory project.

Habermas's theory of communicative action offers an alternative to philosophical relativism. It represents a shift away from individualist philosophies of consciousness and toward recognition of the collective nature of human interaction. Its communicative foundation provides the basis for a radical democratic project. In distortion-free "domination-free" communication a speaker can rationally motivate a hearer to accept his/her position through appeal to validity claims rather than sanctions. The less distorted communication is, the more rational our institutions become.

Though modernist, Habermas's project is not totalizing. One can expand upon his work recognizing the plurality of lifeworlds within a geographically differentiated world. Habermas's work sheds light on the production of places as frequently place-based social movements attempt to halt the expansion of system rationality, i.e. commodification and bureaucratization, and create new spheres of communicative rationality.

FROM THE COUNTRY AND FROM THE CITY: THE GEOGRAPHY OF MILITARY RECRUITING, 1825-1846 by Cynthia A. Miller, Department of Geography, Syracuse University, Syracuse, New York 13244-1166

Historians have often portrayed the early nineteenth century U.S. Army as an institution composed primarily of recently arrived immigrants and native-born ne'er-do-wells recruited into military service from large northeastern cities. Analysis of letterbooks, regulations, and enlistment registers in the National Archives generally supports this thesis, but also indicates that a number of geographic factors greatly influenced where the Army obtained recruits and how it transported them to frontier posts. The Army developed a sophisticated network designed to adapt to frequently changing social and demographic patterns in the United States. From a centralized command office in Washington, D.C., officers constantly analyzed factors such as seasonal employment conditions, transportation availability and costs, and shortages reported at posts, and then positioned recruiting stations in those cities and towns judged most likely to provide adequate numbers of enlistees. Ideally, recruits would be obtained nearest the posts where they were needed, but in most instances, manpower shortages in the West and low public esteem for the military forced officers to accept immigrants and destitute native-born citizens from a wide variety of northeastern and middle-Atlantic urban areas. This research also suggests that a diverse array of other factors (e.g.,seasonal water levels in rivers, pirates in the Gulf of Mexico, and the ease of desertion in some locales) influenced recruiting patterns. The military recruiting system was, in effect, one of the first successful American attempts at national-scale governmental planning, and its study can offer new insight into the social and economic geography of the early nineteenth century United States.

THE CANADIAN-AMERICAN MINERAL TRADE: TRENDS AND PROSPECTS by E. Willard Miller, The Pennsylvania State University, University Park, Pennsylvania 16802.

Canada leads the world in value of non-fuel mineral exports. In 1986 Canada exported a total of $16.2 billion of crude and fabricated minerals, of which $10.6 billion, or 65.4 percent, was destined for the United States. In addition, Canada sold to the United States over $1.5 billion worth of natural gas. The mineral trade between the two nations has been growing steadily in recent decades. The United States is no longer self-sufficient in many minerals such as nickel, copper, zinc, and the platinum group of metals. The proximity of Canada provides a near-by source for these strategic minerals. At the same time mineral exports have played a critical role in Canada's economic development. This study focuses on the development of the mineral trade relationships between the two nations, governmental trade regulations and nationalistic goals, and mineral investment policies. Particular emphasis is placed on the factors that shape the structure of trade over time, and the economic, political and social characteristics that are intricately interwoven in modern mineral trade patterns.

THE GEOGRAPHY OF THE U.S.ENGLISH MOVEMENT by Glenn R. Miller, Bridgewater State College, Bridgewater, Massachusetts 02325.

U.S.English is a national, non-profit, non-partisan organization whose primary goal is to establish English as the sole official language of the United States. A survey of 1004 Americans taken in 1986 showed that 64% of the respondents believed the U.S. Constitution establishes English as the official language of the United States. Studies conducted in the 1980s showed increased ethnic identification in the U.S. which should continue to fuel the debate over an official language. The resistence to establishing English as the official language of the U.S. comes largely from the leaders of ethnic blocs, mostly Hispanic. Incidentally, the United States has become the sixth largest Spanish-speaking population in the world. Many ethnic groups resist assimilation as a betrayal of their ancestral culture and demand government funding to maintain their ethnic institutions. The ethnic leaders have won many battles regarding usage of their respective native tongues. Laws now require multilingual ballots and voting aids, and tax money is spent on voter registration campaigns aimed solely at those who will vote in a foreign language. In responce to these actions, seventeen states, to date, have officially endorsed the primacy of the English language. Eight of the first thirteen states to accept English as their official language are Southeastern states with another three located in the Midwest. Several other states are currently considering similar initiatives. In addition to the official language issue is the related debate over the issue of bilingual education Which many states and municipalities are questioning.

PATH SELECTION IN SPATIAL SEARCH BEHAVIOR by Harvey J. Miller, Department of Geography, The Ohio State University, Columbus, Ohio 43210.

Spatial search as travel behavior results from an individual actively moving through the spatial environment in order to gather primary information to aid in a consumption choice. If an individual is aware of alternatives with known locations but uncertain qualities, the individual is faced with decisions as to which alternatives will be visited and in what order. These decisions arise because travel requires perceived expenditures in terms of time and/or resources. The individual will not necessarily want to visit all alternatives in order to make a choice, and search can stop at any point along the sequence of alternative inspections whether a consumption choice is made or not. Therefore, the path that the individual takes through the alternatives when searching has a primary effect on the ultimate consumption decision.

In this paper, it is argued that the literature on spatial search behavior in general has not considered this path selection question satisfactorily. Particular reference is made to sequential stopping rule models of spatial search. A basic model of path selection in spatial search is also formulated to illustrate this consideration.

ACCESS ROADS IN SEASONALLY DRY TROPICAL FOREST, YUCATAN by K.J. Miller, Department of Geography, University of Toronto, Toronto, Ontario M5S 1A1

This research addressed the question of the impacts of access road development on patterns of Maya subsistence agriculture in a portion of Quintana Roo state, Yucatan peninsula, Mexico. Not until the 1970s were highways and rural roads built into this 'frontier' region. Roads are claimed variously to provide access for farm products to market, to bring scattered inhabitants within reach of education and health services, to assert central control, to serve the forestry sector, and to provide tourists access to remote areas. In the vicinity of Coba archaeological zone, road extension, forest clearance and settlement patterns were traced over time using Landsat and conventional imagery and ground truthing.

The rates of colonization and deforestation are not so high as on Yucatecan lands to the west and north, but subtle shifts in purely subsistence or smallholder economies have taken place. The intensively managed Mayan dooryard gardens for home consumption likely achieve a net nutrient influx. However, from the outer milpas, the sale of crop products to external markets involves a net nutrient loss over the long term. This region has thin, drought-prone soils over limestone, and any switch in agricultural mode towards a net export of nutrients is problematic. The naturally variable fire regime is also being altered by human firing.

MEXICO: TOWARD A GEOGRAPHY OF HUMAN RIGHTS by Mark M. Miller, Department of Geography and Area Development, University of Southern Mississippi, Hattiesburg 39406-5051; and Barbara Keller Miller.

Charges of murder and other serious human rights violations have been issued in the past year against the Mexican army, police forces, and local political bosses. Despite an amnesty which released hundreds of political prisioners, the federal government has been accused of a negligent lack of attention to continued problems. How widespread and how systematic are these violations, and what is their basis? At the same time, how and why has Mexico, over the past six decades, escaped the level of state-sponsored terror which has gripped most of its Middle American neighbors and many of its western hemispheric peers? Finally, are questions such as these relevant and appropriate to the discipline of geography? What aspects of the geographer's expertise could be effectively brought to bear on, e.g., monitoring, etiology, or policy analysis relating to global human rights? Mexico, we believe, provides a useful case study for addressing questions such as these. The relationship between Mexico and the United States on issues of domestic and global human rights also provides a very appropriate forum for the theme of "Sharing the North American Continent: Common Concerns, Different Approaches."

THE HOLOCENE DEVELOPMENT OF SOME BAFFIN ISLAND LAKES.

RAOUL MILLER, INSTITUTE OF ARCTIC AND ALPINE RESEARCH AND DEPARTMENT OF GEOLOGY, UNIVERSITY OF COLORADO, BOULDER, COLORADO, 80309-0450, U.S.A.

Sediment cores obtained from six lakes on southern Hall Peninsula, Baffin Island, illustrate some aspects of the development of lakes and their drainage basins in this environment during the Holocene. Cores varying in length from 25 cm to 1.9m record at least the last 8000 years of sedimentation in these small lakes. Sedimentation rates appear to be extremely slow and have changed appreciably during the latter part of the Holocene after higher rates recorded the period immediately following glacial retreat. Significant changes are also observed in sediment size distribution, magnetic susceptibility, and organic matter content.

Whether these changes reflect climatic forcing or simply development of the natural lake systems remains an important question. Through measurements of present conditions within the lakes; chemical analysis of sediments and organic matter within the watersheds; and careful reconstruction of Holocene environments, it is hoped that climatic signals may be extracted from the "noise" of local conditions contributing to the sedimentary record.

WHEN ARCHITECTURE BETRAYS IDEOLOGY: POST-MODERNISM VERSUS SOCIAL DEMOCRACY IN RECENT BUILDING PROJECTS IN STOCKHOLM

by Roger Miller, University of Minnesota, Minneapolis, Minnesota 55455.

Sweden completed one of the most ambitious building projects in the world between 1965 and 1977, the Million Program, during which one million units of new housing were produced in a country whose population was only eight million people. Legitimation for such a major undertaking derived from the dominant Social Democratic ideology. Designers employed severe (but egalitarian) styles in major mixed-use residential developments, and sited buildings to maximize light and view amenities for all units.

In the mid-to-late 1980's, the Stockholm Department of Planning and Building Control developed several projects in a new post-modern style. These were strongly criticized because they seemed to negate the egalitarian ideology on which state-sponsored development was predicated. In addition, the goals of the new projects diverged sharply from the utilitarian intentions of building schemes during the preceding decades. There was concern about the increased visibility of the architect, and the treatment of buildings as elements in an overall composition. Most disturbing was the production of buildings that varied dramatically in the distribution of amenities.

An examination of three post-modern developments indicates that while the new design aesthetic does run counter to the building ideology of the state housing sector, it accurately reflects the increasing privatization of Greater Stockholm. The conflict surrounding these projects reflects deep-seated ambivalence about the connection between the development of the built environment and social policy. The discourse around the controversy displaces a larger issue which is not being discussed -- the wholesale undermining of post-war housing policy by increasing privatization.

THE SOCIO-POLICITAL EXPRESSION OF ECOLOGICAL CRISIS: A TYPOLOGY OF ECO-ACTIVIST GROUPS IN WESTERN SOCIETIES,

by Roger L. Miller, Geography, University of Kentucky, Lexington, Kentucky 40506-0027.

Earth First!, a radical environmental group in the pacific northwest has a strategy of driving spikes into trees to damage lumber company chain-saws and halt their operations. Meanwhile, the Sierra Club, based in California, promotes their views of the environment by selling calendars with beautiful photos of landscapes. Both groups have a strong commitment to the preservation of the environment, but choose to act in different ways. However, these actions are based on different socially constructed concepts of the "human/environment relationship" that fall within three major social paradigms: industrial-technologic, environmentalist, and ecological. This paper examines a range of current eco-activist groups in western societies and characterizes them by their different concepts of the "human-environment" relationship. Moreover, this paper examines the viability and effectiveness of these groups as related to their deeper philosophical paradigm which may be contigent upon a cultural context that varies geographically.

GEOMORPHOLOGY OF BELIZE, CENTRAL AMERICA

by T. E. Miller; Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809

Belize is dominated by the Maya Mountains, a horst of Paleozoic meta-sediments and Triassic intrusives dating from the mid-Cretaceous. They are an ancient low relief surface 400-1000m a.s.l., whose deeply weathered soils occasionally support only pine savannas in the tropical humid climate. The Mayas are bounded except to the west by major faults, whose steep, deeply dissected gorges show evidence of progressive stream piracies.

The Mayas are fringed by a rugged, mature karst developed everywhere Cretaceous carbonates are exposed. This "cockpit karst" occurs from 0-700m a.s.l., w/local relief of <200m. It has resulted from fluvial dissection, and numerous areas remain alluviated near the mountains. Graded multi-level galleries (to 70m relief) within the karst comprise cavern systems of which at least two exceed 40km in mapped extent. These levels appear to correlate with terrace sequences of coarse clastics derived from the mountains. Calcareous soils in the karst depressions are generally fertile with thick rainforest. The numerous cave streams of the karst temper the normally very flashy rain response of the throughflowing rivers from the mountains.

Northern Belize is a seasonally arid, low relief (0-250 m a.s.l.) surface of Tertiary carbonates of the Yucatan Platform, and an eastern coastal plain (including the barrier reef complex). Most of these northern plains is lagoon and low-gradient river topography covered by clastics from the Mayas, or a subdued karst surface. The soils are dominantly fertile and calcareous, but local silicic sedimentary ridges support conifers. The shelf offshore is presently a barrier reef complex overlying karst features developed during lower sea stands.

GLOBAL CLIMATE CHANGE: A CHALLENGE TO INFRASTRUCTURE PLANNERS

by Ted R. Miller, J. Christopher Walker, G. Thomas Kingsley, and William A. Hyman, The Urban Institute, 2100 M St. NW, Washington, DC 20037.

The threat of global climate change has added a new uncertainty factor to infrastructure planning. Case studies suggest a doubling in CO2 levels primarily could require urban infrastructure investments to ensure an adequate water supply and to prevent sea level rise from inundating coastal communities. Impacts are likely to vary substantially by region. Cleveland, and presumably other Great Lakes cities, appear likely to benefit from milder weather but not experience substantial costs for infrastructure construction or management. Rising sea level could require diking and pumping or raising the land surface in many urban coastal areas, including more than half of the 20 largest metropolitan areas. The cost in Greater Miami alone could exceed $600 million. It appears that inland cities primarily need to be concerned about water supply, electric power, and the possibility of increased subsidence problems.

THE HYPOTHESIS OF MINIMUM VARIANCE RECONSIDERED

by Theodore K. Miller, School of Public and Environmental Affairs, Indiana University, Bloomington, Indiana 47405.

The minimum variance hypothesis was first enunciated by Langbein (1964, p. 303) as follows: "From these general statements, the formulation of the most probable condition is postulated in the following terms: (1) In accommodating a change in stream power, the channel changes so that each component of power changes as equably as is possible, and (2) the later postulate, in turn, being given specific meaning, total variance of the components of power tends toward a minimum, or as a corollary, their covariance tends toward a maximum". The important point in this passage, one that is not emphasized in the literature, is that the fundamental concept advanced by Langbein is that of equable change and not that of minimum variance. Indeed, this passage implies that minimum variance is simply a particular approach to formalizing the more general concept of equable change. This raises the possibility that an alternative implementation of the equable change idea might lead to an advance in our ability to evaluate it's validity.

In this research equable change is conceived as implying equal exponents in hydraulic geometry equations when fitted to standardized hydraulic variables. The hypothesis of equal exponents is explored for a set of 77 gauging sites in Nebraska using the SAS procedure SYSLIN. Approximately four years of hydraulic width, depth, velocity and discharge data for each site was provided by the USGS district office. The results indicate that many streams behave hydraulically in a way consistent with the idea of equable change. Those that do not most commonly are constrained with respect to adjustment in the width dimension.

ENERGY BALANCE INVESTIGATIONS: CONNESS GLACIER, SIERRA NEVADA CALIFORNIA by Tomas A. Miller, Arizona State University, Tempe, Arizona 85287-1508.

Energy balance and microclimatic observations were made on the Conness Glacier during August 1989. Conness Glacier is a small, northeast facing, "cirque type" glacier immediately east of the Sierra crest. Preliminary evidence suggests that Conness has furthered its existence by creating its own unique microclimate in the cirque basin.

Owing to its small size, Conness displays strong diurnal cycles of energy transfer and stream discharge. Total energy transfers are dominated by radiation balance components; albedo has a particularly strong effect. Stream discharge reaches a maximum near 1500 hours LST indicating minimal lag effects between peak energy and peak discharge. Preliminary results indicate that diurnal energy balance changes may effectively predict changes in stream discharge.

SOCIETAL LABELING AS A SPATIAL FACTOR IN THE RESISTANCE TO CHANGE by Vincent P. Miller, Jr. Indiana University of Pa., Indiana PA 15701

The now classic literature of the geography of diffusion emphasize that the effects of innovation are very unequal through space. Many factors affect the unequal spread of the diffusion of ideas and technology. One such factor needing more study in this respect is that of a subculture's perception of space. A model of such "spatial cultural components" has been presented in an earlier paper by the author. The purpose of the paper presented now is to focus on an aspect of these components through the application of labeling theory in understanding the resistance to change in a microregional setting. Some spatial subcultures, too often thought of as being simply marginal areas, have distinct and well nurtured spatial identities. Some examples are certain urban ghettos and certain rural areas, such as mountain valleys. From the standpoint of labeling theory, coming from the anthropologic and psychiatric literature, these areas are "typed". Typed areas are rigidly categorized both from within and also by the outside world as to their socioeconomic personalities. The purpose of the present enquiry is to attempt a beginning understanding of the function of labeling in filtering and resisting change in a spatially distinct subculture, that of Setesdal in South Norway. Labeling criteria applicable to the study area are presented. An analysis of the diffusion filtering processes found in the study area are discussed and some cross-cultural parallels are noted.

THE ROLE OF BUOYANCY IN THE ENERGY BUDGETS OF URBAN CANYONS by G. Mills, Dept. of Geography, Bowling Green State University, Bowling Green, Ohio 43403-0217.

Air temperature measurements in urban canyons have indicated that large gradients occur only in the immediate vicinity of canyon facets. Strong surface heating may generate buoyancy-driven circulations within the canyon during instances of weak ambient airflow. Moreover, such circulations may aid or hinder the development of conventional circulations associated with the transfer of momentum from above-canyon flow. In any case, these buoyancy circulations may serve as significant heat transfer mechanisms between the canyon and overlying atmosphere.

The circulation patterns and associated heat transfer caused by surface heating are examined with a fluid modeling package, FIDAP. Input into the model and information against which to compare model output are provided by a series of measurements made at a canyon site during 1988. The canyon profile establishes a lower boundary in the model. Measured surface temperatures are input as lower boundary conditions and the atmosphere is set to be initially at rest. The model is run until a steady state is reached. Model output will be compared with measurements to see if the predicted flow pattern and heat transfer are consistent with the field results.

NEW FORMS OF MANUFACTURING AND THE SMALL FIRM: THE CASE OF THE U.K. HIGH FIDELITY AUDIO SECTOR by Simon Milne, Assistant Professor, Department of Geography, McGill University, Burnside Hall, 805 Sherbrooke Street West, Montreal, Quebec H3A 2K6, CANADA.

There is currently a great deal of debate over the role that small firms have to play in an increasingly 'flexible' manufacturing environment. To date much of the literature has rested on a rather limited spatial and sectoral empirical base. This paper adds to the body of empirical evidence through reference to a recent survey of over 60 firms operating in the UK high fidelity audio sector. The sector is characterised by increasing levels of competition and by rapidly changing market demand.

In response to these pressures firms are implementing a range of new manufacturing techniques - designed to increase both the flexibility and efficiency of production. These changes in production organisation are studied with the aid of a detailed sector wide analysis of trends followed by a discussion of several case studies.

The concluding sections of the paper deal with the potential spatial implications of the findings. Particular attention is paid to the changing locational base of the industry within the UK.It is shown that,for the high fidelity industry at least,many recent theoretical assertions must be tempered or re-evaluated if they are to accurately describe and predict the changing role of the small firm in changing industrial societies.

URBAN LAND MANAGEMENT IN CHINA: PATERNALISM OR REFORM by Fan Ming, The University of Akron, Akron, Ohio 44325.

Land management in China is based upon traditional Marxist principles of collective ownership of property and resourses. In place since the early 1950s, the current system now exhibits problems of over-centralization and economic inefficiency. This paper discusses the theoretical origins of the present system and its current operation. Difficulties being experienced by the system in terms of economic efficiency and social equity are discussed. Improvements or changes to the system to promote economic development and reform are also suggested.

THE YELLOWSTONE NATIONAL PARK VACATION ORBIT by Robert C. Mings, Department of Geography, Arizona State University, Tempe, Arizona 85287-0104

Stuffing everyone into the family car and heading off to tour the scenic wonders of the American West is a time-honored type of American vacation--a common theme among writers and even the stuff of Hollywood movies. The general purpose of this study is to examine the types of trips taken to western landmarks (as evidenced by their spatial dimensions). More specifically, to what extent are visitors to western national parks on an orbiting type trip that includes stops at many parks? Who are these people on a "grand tour" of western landmarks? Where do they visit? Data were gathered from approximately 600 registrants at Canyon Lodge in Yellowstone National Park during July and August of 1989. Respondents were provided with a U.S. map and asked to indicate (sketch) the route they traveled from home to Yellowstone and back home. Several patterns of routing occur. Expectedly, one is the "grand tour". But the importance of fly/drive and direct/nonstop types of trips was not expected.

LESSONS LEARNED FROM CANADA'S POSTWAR HOUSING EXPERIENCE by J.R. Miron, Scarborough College, University of Toronto, Toronto M1C 1A4 Canada.

Since 1945, the housing of Canadians has changed in important ways. This paper summarizes the findings of a recently-completed major multidisciplinary study of the nature and extent of change, and associated causes and consequences. The study emphasizes the following important changes: the diffusion of new construction materials and technology, a deepening of housing markets, re-organization of the residential construction industry, the emergence of both new commuter suburbs and high density urban living, renovation of the existing stock, the changing price of housing and the continuing affordability enigma, the public housing boom of the 1960s and 1970s, the eradication of substandard housing and slums, the construction of new senior citizen and special purpose housing, the emergence of subsidies for social housing, the shifting targets of housing policy, and the emergence of security of tenure legislation and rent regulation. The paper considers the extent to which these changes can be seen as the outcomes of demand forces, supply forces, and policy intervention, and draws conclusions about lessons to be learned about the production of housing stock and services, the consumption of housing, and the roles, successes, and failures of various levels of government.

DOWNTOWN REVITALIZATION: The case of St. Jacobs, Ontario by C. Mitchell, R. Nolan and F. Hohol, Department of Geography, University of Waterloo, Waterloo, Ontario.

Downtown revitalization is a tool used to encourage community economic development. This paper evaluates the success of revitalization in the village of St. Jacobs, Ontario. The specific objective is to determine if revitalization has stimulated employment and improved the quality of life of residents living within the community. This objective is met in three steps: first, a brief description of the study site is presented; second, the revitalization process outlined; and third, the impacts of downtown redevelopment are presented from data provided in a survey of local entrepreneurs and residents. Evidence collected reveals that the equivalent of more than 500 full-time jobs have been created in St. Jacobs. However, many residents feel that the community is no longer a peaceful rural village but has developed into a commercial tourist trap. Hence, while generating employment opportunities, downtown revitalization has not significantly improved the quality of life of local residents.

BUILDING THE MORAL CITY: LANGUAGE, SPACE AND THE PRODUCTION OF ORDER DURING THE DEPRESSION IN JOHNSTOWN, PENNSYLVANIA by Don Mitchell, Rutgers University, New Brunswick, NJ 08903.

The provision of care for those at the margins of society is inseparable from the need and desire to control them. The marginal (such as the homeless) exist in landscapes that are not of their own making - they inhabit spaces that are not their own. Through the production of disciplinary spaces that work to order the disorderly, to make moral the immoral, the legitimacy of dominant social relations within a city is protected, even as the material basis for those relations is constantly changing.

In this paper I explore the production of the spaces of marginality and control as it evolves during the Depression in the Pennsylvania city of Johnstown. An examination of the production of landscapes of order - and the language through which that production is legitimized - shows how Johnstown may stand as a metaphor for the historical production of the landscapes of order throughout the United States. By telling the story of the construction of order and marginality within the spaces of Johnstown as the city economically and socially restructures in the 1930s, I shed light on the nature of social control as it is expressed through the production of landscapes of welfare, landscapes of care, and landscapes of discipline.

THE INTERNATIONAL DECADE FOR NATURAL DISASTER REDUCTION: EVOLUTION AND STATUS by James K. Mitchell, Rutgers University, New Brunswick, New Jersey 08903.

This paper provides a case study of international collaboration for the resolution of global environmental problems, via an analysis of the organization and conduct of planning for the forthcoming IDNDR (1990-2000), from its inception in 1984 to the present. Topics include, among others, participants, planning issues, mechanisms for organizing research and communicating findings, relationships between the International Decade and various national Decades, and unresolved problems.

The methodology employs a comparative analysis of the IDNDR and other collaborative international science and development programs. Data are drawn from a survey of participating countries, interviews and correspondence with key actors, available documentary evidence (i.e. reports, communiques, declarations, plans, research agendas), and participant observation. Findings suggest that the Decade's primary goal of hazard reduction is hampered by a narrow definition of tasks but that many untapped opportunities for broadening the focus might still be exploited.

LEISURE TIME AND SPACE USE: FEMALE - MALE DIFFERENCES by Lisle S. Mitchell, Department of Geography, University of South Carolina, Columbia, South Carolina 29208.

The purpose of this research is to investigate the leisure time and leisure space use of college students. Twenty-two females and 24 males reported the frequency, duration, and location of their leisure activities for a period of one month. These data were recorded, tabulated and used to test three null hypotheses. The hypotheses were that there is no significant difference between females and males with regard to the frequency, duration, and distance travelled to participate in recreation and tourism activities. Hypotheses were tested using difference between the means techniques, simple correlation, and the K-S test. All three hypotheses were rejected, and it was concluded that significant differences exist between females and males with regard to activity type, frequency of participation, time spent in activities, and distance travelled to participate in leisure persuits.

FOREIGN NON-GOVERNMENTAL ORGANIZATIONS AND NATURE CONSERVATION IN BELIZE by Michael S. Mitchell, Department of Geography, University of Tennessee, Knoxville, TN 37996-1420.

Conservation of nature has emerged in recent years as a major topic of international discourse which has been linked to the survival of the human species. One result has been the demand for sound conservation programs to protect the global patrimony, especially in the species-rich tropical developing nations. Many developing nations, however, lack the necessary resources to implement such systems and consequently, rely on and become the target of foreign conservation organizations, especially non-governmental conservation organizations (NGCOs).

The newly independent (1981) nation of Belize has recently become the target of several foreign NGCOs, yet formal mechanisms have not been set up to coordinate their respective activities. What is the status of conservation in Belize and what role do these NGCOs play? Do their activities reveal a concern for the economic and social needs of the country or are they simply driven by organizational self-interests? Do these groups cooperate with each other and do they work effectively with local government and conservation organizations?

Research indicates that three prominent American-based NGCOs are behind almost all conservation activity in the country. This paper traces the history of their involvement and examines the sociopolitical constraints to conservation inherent in Belizean society.

MARKETING TO THE AFRICAN-AMERICAN CONSUMER: SELLING SMOKE by Olivia Mitchell-Morris, Rutgers University, New Brunswick, NJ 08903

In the past twenty years multiple studies have linked smoking to lung cancer. While cigarette smoking is now on the decline, the death rate from lung cancer among males has increased 200% since 1950. Additionally, the proportion of black males who smoke is higher at every age level than for white males.

This study examines empirical data on outdoor advertisements in selected study areas and reviews current literature on smoking trends and cancer rates among black males. The goal of the study is to determine whether cigarette manufacturers are marketing to blacks through neighborhood advertising campaigns.

PERCEPTION OF AND CONCERN ABOUT ENVIRONMENTAL CHANGE by Robert C. Mitchell and Carl Wilmsen, Clark University, Graduate School of Geography, Worcester, MA.

This paper discusses the conditions that lead to individual awareness of and concern about environmental changes. Environmental survey findings in the United States over the past twenty years are used to identify the characteristics that distinguish environmental problems which have high levels of concern from those which appear to be of less concern to individuals. These findings are used to develop a predictive model which is applied to likely global changes in an effort to forecast future citizen response.

INTERREGIONAL MIGRATION IN THE SOVIET UNION: 1970 CENSUS RESULTS by Beth Mitchneck, Columbia University and the Brookings Institution, 1775 Massachusetts Avenue, N.W., Washington D.C. 20036.

A mismatch of the location of labor and the location of natural resources and productive capability has caused grave difficulties for the Soviet economy. Interregional migration can play a very important role in solving some of the problems caused by this mismatch. This paper considers the effect of regional economic development on interregional migration in the Soviet Union for two years, 1968 and 1969. By using theories of migration developed in market economy settings, as well as gravity model methodology, this study seeks to determine the relevance of "Western" theory for analyzing migration in a socialist economy. Economic and demographic variables are used to describe and explain the push and pull factors associated with the migration patterns. Distance between the origins and destinations receives particular emphasis. In general, distance did exert a mitigating influence over migration. However, migration into the most developed areas of the European USSR, (e.g. the coal producing region of the Ukraine and the central region including Moscow), did not appear to be influenced by the distance-decay factor observed elsewhere for 1968 and 1969. The used of origin and destination-specific gravity models in the non-market economy context proves relatively successful and appropriate for explaining interregional migration.

HISTORICAL CLIMATES OF THE NORTHEASTERN GREAT BASIN: 1830-1853 by Cary J Mock, Department of Geography, University of Nebraska, Lincoln, Nebraska, 68588-0135.

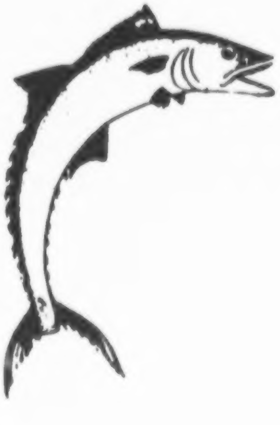
This study reconstructs summer climatic conditions of the northeastern Great Basin and adjacent Rocky Mountains from 1830-1853 using historical documents and tree-rings. The study emphasizes the use of historical documents as a climatic proxy data source since no historical climatic reconstruction for the region has yet been done. The summer historical data were organized in three separate parts. Part One considered summers which data were scarce. Part Two dealt with more data, but it was not plentiful enough to calibrate with modern climatic data. Climatic information from this data were analyzed temporally and spatially from temperature and precipitation descriptions. Part Three considered summers for years when data were sufficient for calibration with modern data. Monthly frequencies of daily ice and frost, and precipitation descriptions were compared with the modern record. Summer historical results generally agree with dendroclimatic evidence, with the exception of historical results from years with sparse data, mostly before 1843. Results of the study indicate that the summer climate from 1843-1853 was generally colder and drier than today. Historical documents can be used to reconstruct climates if sufficient data are available and if one carefully examines the data for reliability. Unexploited historical documents from the study area still exist and, with tree-rings, can provide valuable information about climatic conditions during the Little Ice Age.

IRANIAN IMMIGRATION AND SETTLEMENT IN THE U.S., by Ali Modarres, Department of Geography, University of Arizona, Tucson, Arizona, 85721.

Iranian immigrants comprise one of the most recent groups of political/elite immigrants to the U.S. These immigrants have portrayed a very unique residential and business distribution which could be used to re-evaluate some of the urban ecology models regarding ethnic community formation. Since the majority of already developed models deal primarily with what can be called economic immigrants, a new body of theory is necessary to explain the spatial distribution of political/elite immigrants such as the Iranians. This paper will discuss the socioeconomic and ethnic characteristics of Iranians in Los Angeles and Orange counties, and through utilization of urban ecology and demographic techniques, it will provide an alternative in explaining and predicting the community formation process of recent political/elite immigrants. This paper will also attempt to portray some of the shortcomings of the existing methodologies and approaches in ethnic geography.

EXAMPLES OF DIGITAL SLOPE-ASPECT DISPLAYS: A NEW ANALYTICAL APPROACH IN CARTOGRAPHY, by Harold Moellering, Dept. of Geography, Ohio State University, Columbus, OH 43210, Jon Kimerling, Dept. of Geography, Oregon State University, Corvallis, Oregon 97331.

Recently a new approach to the display of the slope-aspect component of cartographic surfaces has been developed by Moellering and Kimerling. This approach applies to any cartographic surface in two or three dimensions that is parametric and that meets the continuity assumption. This new slope-aspect color display process utilizes the opponent process color theory in such a way that it simulates relief shading with the hue and saturation portion of the color space. This color process can be manipulated numerically to analytically display a wide variety of cartographic surfaces and show broader patterns and surface detail more clearly than can be accomplished with more conventional displays. Example surfaces will be shown from both the topographic and hydrographic domains.



THE DISTRIBUTION AND REGIONAL VARIATION OF SPORTS FACILITIES IN SWDEDEN by O. MOEN and K. PERSSON, Dep. of Human and Economic Geography, School of Buisness and Legal Science, Gothenburg University, Gothenburg, Sweden.

Studies of recreational facilities have primarly focused on the site, rather then on distribution and regional variation. This paper attempts to show the regional differences in the supply of sports facilities in Sweden, on the province level.

Data of the distribution of sports facilities in Sweden, was collected in collaboration with the Swedish Association of Local Authorities. Through per capita calculation, was it possible to establish an index for any province, for comparison with the national norm and with other provinces, for different types of sports facilities. The per capita approach to show the regional variation in the supply of sports facilities, is indicative of the emphasis placed on the sporting activities carried out.

The results are shown in mapped form, where areas of above- and below-average provision of sports facilities, forms sports regions, indentifying areas (sports regions) of above-average participation and intrest in sporting activities.

JAPAN AND THE GLOBAL ENVIRONMENT: ATTITUDES AND POLICIES by Phyllis Mofson, Office of The Geographer, U.S. Department of State, Washington, DC 20520-6510

To the Western community, Japanese attitudes and policies on global environmental issues often seem inconsistent and paradoxical. On one hand the Japanese have been accused of whale genocide, deforestation in Southeast Asia, and mass consumption of ivory and other endangered species products. On the other, the Japanese are viewed as traditional lovers of nature, major funders of research on global warming and ozone layer depletion, and involved in worldwide tropical forest management and conservation efforts.

This paper explores how these contradictory positions may be reconciled by the Japanese, particularly in light of domestic environmental attitudes and policies.

ACCOMMODATING SCIENTIFIC PAYLOADS ONBOARD THE SPACE SHUTTLE, by, R. R. J. Mohler, A. K. Singhal, G. W. Deardorff, Lockheed Engineering & Sciences Company, 2400 NASA Road 1, Houston, Texas 77258, and W. S. Beckham, Mission Management Office, NASA/Johnson Space Center, Houston, Texas 77058.

Very few members of the scientific or engineering communities are aware of the procedures and specifications required to integrate a payload onboard the Space Shuttle or of the timelines involved. As a start in alleviating this information gap, we present the "Mission Management" necessary to accommodate scientific experiments for a Shuttle Flight.

Many microgravity experiments such as growing protein products, cell processes and composite testing take place in the Shuttle Middeck area in specified lockers. These lockers are self-contained and may be supplied with electrical power.

Many of these Middeck experiments are the precursors to the commercialization of space -- through space stations and space-based laboratories. Understanding the Mission Management processes will expedite the design of the experiments by the principal investigators and therefore experimental results.

DEVELOPMENTS IN USING PUBLIC SERVICES IN THE RANDSTAD HOLLAND by G. Molenaar, University of Utrecht, Department of Geography, P.O. Box 80.115, 3508 TC Utrecht, The Netherlands.

Persons and households differ in the utilization of public services. These services are non-profit in character and are mainly supplied by the national and local government. Insight in the relevance of characteristics like age, type of household, income and the like, is of importance with respect to policy-measures regarding public service provision. It also contributes to the explanation of spatial patterns in making use of these services.

Various sources of data regarding supply and utilization of services in the realm of health care, well-being and leisure activities are analysed. Attention is directed towards spatial differences and developments in the Randstad Holland in the nineteen-eighties. Especially the variation between regions, between cities and between parts of the city will be investigated.

Demographic, sectoral and policy-related factors are underlying these changes and differences. Changes in age and household composition of the population do have effects on the utilization patterns of public services. Developments of a more autonomous nature also manifest themselves in these patterns. As an example the growing participation of the elderly in the utilization of various leisure-services could be mentioned. Changes like this deserve attention when thinking about future developments and policy-decisions.

The results of the analysis indicate that in implementing policy-decisions it is not enough to point at general developments in the utilization of services by specific groups. Local population characteristics should be taken into account with regard to public service provision.

BRITISH COLUMBIA: THE PACIFIC COAST PIVOT IN SALMON AQUACULTURE," by R. L. Monahan, Western Washington University, Bellingham, WA 98225

British Columbia has seized the key role in salmon aquaculture on the Pacific Coast. After an early start in Washington State salmon farming was introduced in British Columbia. With strong government encouragement the industry has expanded and is well established. In Washington State salmon farming is still functioning but the combined opposition of three unlikely allies, wealthy upland property owners, commercial fishermen and environmentalists has severely limited the spread and growth of production.

Alaska, the other Pacific coast player, has one experimental farm. A moratorium on salmon farming is in effect until July 1, 1990. The Alaska potential equals or exceeds that of British Columbia. The future developments of the three producing regions are examined and discussed.

NEWSPAPER HOME-DELIVERY AREAS IN CENTRAL NEW YORK: EXTENDING THE UMBRELLA HYPOTHESIS FROM ONE TO TWO DIMENSIONS by Mark Monmonier, Department of Geography, Syracuse University, Syracuse, New York 13244-1160. Mon2ier@Sunrise.BITNET.

The umbrella hypothesis is a one-dimensional geographic model of spatial competition used to explain the overlap of newspaper circulation areas. As proposed by economist James Rosse, the hypothesis is a nested four-level hierarchy of distribution zones, ranging from with regional newspapers at the highest level, through satellite-city and small-city daily newspapers, to local weekly newspapers at the lowest level.

Maps based upon a sample of home-delivery circulation routes in an 18-county study area centered on Syracuse, New York, demonstrate that the umbrella hypothesis is basically correct. Yet, the distinction between "satellite-city" and "small-city" is vague at best, and a three-level hierarchy seems more appropriate, at least for smaller metropolitan areas. Moreover, the hypothesis, developed in the late 1970s, does not consider prominent national newspapers, such as the *New York Times*, *USA Today*, and the *Wall Street Journal*; surely the highest level in a four-level hierarchy is the generally ubiquitous national daily newspaper.

A modified model must also address the substantial competition-free zone in and around the central city, where a metropolitan daily newspaper typically competes only with national dailies and a variety of weeklies. Further modifications are required in two dimensions to accommodate the regional editions of metropolitan newspapers as well as the influences of county size and shape, geographic eccentricity of publishing centers within counties, and proximity to other publishing centers.

THE INFLUENCE OF SUBURBAN RESIDENTIAL DEVELOPMENT ON CENTRAL CITY HOUSING SUPPLY by Frank J. Costa and Charles B. Monroe, The University of Akron, Akron, OH 44325-5005.

The dynamics of metropolitan housing supply have long shown new suburban residential development predominating along with a filtering of less desirable and physically deteriorating, central city housing to less economically advantaged groups. This paper is a report of ongoing research investigating the housing needs for the Akron, Ohio metropolitan area through the first decade of the twenty-first century. A previously developed model is used to predict the extent of excess housing in the central city created by future housing starts in suburban areas. Key exogenous variables for the model are estimates of future household size and the geographic distribution of new construction within the metropolitan region. Alternative scenarios that could represent various future economic and social conditions for the region are explored to determine potential changes in the metropolitan housing supply. The implications of using this model in planning are also examined.

POST-*.ISM IN THE THIRD WORLD: Fragments from Brasil and India, by Roberto Monte-Mor & Sumanta Ray. Graduate School of Architecture and Urban Planning, UCLA, Los Angeles, California 90024.

In this paper we explore the relationship between post-modernism and development studies. We begin by examining the origins and manifestations of the 'contemporary crisis'. We argue that it cannot be understood only in terms of the events and conditions in the center itself, and that 'peripheral voices', those of the Other, have also played a role in the delegitimation of grand narratives.

We then discuss expressions of Modernity and argue that those necessarily led to 'incomplete projects' in the Third World, and that the notion of crisis has always been there. We examine the attempts at modernity in Brazil and India and critique the forms of 'developmentism' embedded in them.

We return to the question of post-modernism and development studies to identify opportunities for social invention in the Third World. We do this in a two-fold fashion. First, we note similarities and divergences in the post-modern condition and argue that the contemporary moment is characterized by the blurring of rigid boundaries and relations between the First and Third Worlds, core and periphery, the Self and the Other. Second, we explore possibilities contained within the post-modern condition to redefine and transform our understanding of development - toward a 'post-developmentism'?

A COMPARISON OF LAND VALUE CHANGES IN FOUR COMMUNITIES WITH DIFFERENT FLOOD HISTORIES by Burrell E. Montz, SUNY-Binghamton, Binghamton, New York 13901, and Graham A. Tobin, University of Minnesota, Duluth, Minnesota 55812

Floods of differing severity and frequency are expected to have different impacts on the residential housing market, partly because of the damage incurred and because of local perceptions about the threat of flooding. These differences are expected to vary within individual floodplains and between communities. This research evaluates changes in property values in four communities. Wilkes-Barre, Pennsylvania experienced catastrophic flooding in 1972 and has not been flooded since. DesPlaines, Illinois had two floods within ten months of one another, while Linda and Olivehurst, California recorded their first flood following a levee break in 1986. These differences in severity and recurrence suggest that the housing markets will adjust differently.

The findings indicate variation in impact among communities and within local floodplains. In Linda and Olivehurst, the length of the recovery period depended upon the depth of flooding. However, within two years of the flood, most properties had recovered to median pre-flood values. Market recovery in DesPlaines was hindered when the second flood occurred. Yet, the entire flooded area exceeded pre-flood values within 26 months of the first flood. Wilkes-Barre's experience was influenced by the Federal aid available to flood victims. While property values recovered, the recovery period was longer than in the other cases, probably because of the widespread destruction.

These findings suggest clear spatial and temporal differences in impacts from flooding. Recognition of these differences can enhance future flood alleviation programs.

"KUV HAIS LUS HMOOB ME ME XWB"**: QUALITATIVE FIELDWORK IN A HMONG COMMUNITY by Kristen L. Monzel, Department of Geography, Syracuse University, 343 H.B. Crouse Hall, Syracuse, New York 13244-1160.

Geography has both a fieldwork tradition and a longstanding interest in immigrant and minority populations. Qualitative research methods such as participant observation are often discussed in graduate-level seminars on methodology. Geographers, however, seldom select qualitative methods as primary research designs. This is at least partly due to the discipline's continuing perception of them as "soft science."

Using my research on the Hmong refugee community in Syracuse as illustration, I discuss why qualitative research methods are not only appropriate but essential for some research questions. Prior to their involvement in covert U.S. operations in Laos, the Hmong were swidden farmers in the remote mountain provinces. After the U.S. withdrew in 1975, the Hmong were singled out for extermination by the Pathet Lao. As a result, many Hmong fled, and approximately 100,000 sought refuge in the U.S. Despite cold winters and considerable pressure from Hmong elsewhere to leave, about 350 Hmong currently reside in Syracuse. My research questions focus on the structure of this Hmong community, their perceptions of and experiences with Syracuse as a place, and their rationale for remaining. Participant observation, indepth interviewing, life histories, and archival documentation provide the data. The paper addresses such methodological issues as gaining access to the Hmong and resettlement agencies, using key informants and interpreters, and analyzing the data.

** "I only speak a little Hmong."

A LOOK AT GEOGRAPHICAL APPROACHES TO U. S. RURAL DEVELOPMENT by Henry Moon, Department of Geography and Planning, The University of Toledo, Toledo, OH 43606

Published findings of geographical inquiries into the many aspects of rural development in the United States indicate the diminished role of the subject among present-day geographers. The number of articles penned by geographers and appearing in major journals concerning rural development in a developed nation context is miniscule relative to the number addressing rural development in developing nations. Among the reasons frequently cited for this bias are the tendency of North American scholars to focus on urban and peri-urban issues, rural to urban migration, and topical cycles occurring within the discipline. More tangible reasons include a lack of funding agencies concerned with rural development in a developed nation context, editorial resistance to potential manuscripts, the lack of a geographical journal dedicated to the subject, and the lack of excitement and/or glamour often associated with foreign travel and distant field research. Several aspects of United States rural development that beg to be explored in a geographical context are the large scale impacts of economic restructuring, changes in transportation, public policy shifts, and migration.

GREAT PLAINS DROUGHTS, 1820-65: DOCUMENTARY AND DENDROCLIMATIC EVIDENCE by C. Moore, Western Kentucky University, Bowling Green, Kentucky 42101.

Recent dendroclimatic investigations of areas on the margins of the Great Plains have indicated that moderate to extreme droughts predominated in 1820-24 and 1855-65. Only two droughts of more than mild intensity were found for the years 1825-54. It has been acknowledged, however, that dendroclimatic assessment of Great Plains droughts during the pre-settlement period is conjectural because of the sparseness of tree-ring data in the interior.

Recorded observations by nineteenth century overland travelers and residents were examined to determine the degree to which climatic conditions in the interior corresponded with those on the margins. A drought severity index was derived from (1) the effects of grass scarcity on draft, pack and riding animals, (2) hydrologic deficits and (3) adverse impacts on Indian and Anglo crops.

Although there was relatively close agreement between observed conditions and dendroclimatic results for the 1855-65 drought, evidence from the interior differed substantially from that on the periphery for earlier periods. During 1825-54, eleven droughts of extreme to moderate magnitude were documented. Only one moderate drought was observed in 1820-24 and 1820 appears to have been one of the wettest years of the 1820-65 period.

THE CALIBRATION OF DISAGGREGATE CHOICE MODELS USING ORDINAL STATED PREFERENCE DATA: AN ASSESSMENT WITH EXAMPLES FROM RETAILING AND TRANSPORTATION by L.A.R. Moore Department of Geography, University College of Swansea, Singleton Park, SWANSEA SA2 8PP, U.K.

As disaggregate choice models have become increasingly sophisticated and powerful, the deficiencies of revealed preference data on which they have traditionally been calibrated have become critical. This has led to the development of stated preference data collection methods in which survey respondents record their preferences between alternatives in hypothetical choice scenarios. There are a number of methods available to measure stated preferences, but one favoured in a number of studies is to ask the respondents to rank a set of alternatives in order of preference. This paper describes two studies, one in retailing and the other in transportation, in which such ordinal data have been collected, and describes an innovative method of analysis of these data - the 'exploded logit' model. This model is operationalised by assuming that preferences are independent of rankings, and thus each successive ranking is seen as a choice out of a diminishing number of alternatives. The paper investigates this assumption, and describes how the exploded logit model may be used to calibrate preference models for individual respondents and groups of individuals (market segments). The utility of the exploded logit model is reviewed.

POPULATION CHANGE AND REGIONAL DEVELOPMENT IN APPALACHIAN KENTUCKY, 1870-1930 by Tyrel G. Moore, Department of Geography and Earth Sciences, University of North Carolina at Charlotte, Charlotte, NC 28223.

When the National Resources Planning Board examined economically depressed regions during the 1930's, Southern Appalachia, particularly eastern Kentucky, stood out as an area of poverty intensified by population pressure and limited economic resources. Subsequent research on regional population dynamics related to persistent economic problems focuses on that theme. Much attention is also devoted to outmigration, a major feature of the region's development during the past four decades.

Appalachian Kentucky's economy expanded significantly between 1870 and1930, establishing population concentrations as part of the process of regional economic evolution. This paper presents population changes which took place prior to the 1930's cartographically in order to discuss external and internal forces which shaped regional development before its stagnation and resultant poverty.

THE CASE OF THE VANISHING RIVER: READING THE LANDSCAPE OF THE SANTA CRUZ RIVER, TUCSON, ARIZONA by Barbara Morehouse, Department of Geography and Regional Development, University of Arizona, Tucson, Arizona 85721.

The Santa Cruz River in the vicinity of Tucson, Arizona has a history of human activity that dates back some 11,000 years, spanning a cultural timespan from paleoindian hunter-gatherer sites through modern American city. A perennial but intermittent stream until the early twentieth century, the river offered an oasis, means of livelihood, and refuge from the grind of daily life to generations of inhabitants and travelers alike. In the late nineteenth and early twentieth centuries, entrenchment of the stream caused the surface water to disappear. The disappearance of the surface water, followed shortly thereafter by disappearance of riparian vegetation, ultimately resulted in a riverine landscape which was largely invisible to the dominant community. Recently, attempts have been undertaken to recreate an authored riverine landscape along the Santa Cruz. But have these activities been successful? This paper discusses the results of analyses of the "before" and "after" landscapes at each of these two turning points and examines what these analyses reveal about the ways in which physical processes, institutions and individuals have interacted to produce particular landscapes at particular times.

IMPACTS OF THE POTENTIAL SEA-LEVEL RISE ON THE PORTUGUESE COASTAL WETLANDS by M.Eugénia S. Albergaria Moreira, University of Lisbon, Center for Geographic Studies, Faculty of Letters, 1699 Lisbon, Portugal.

The coastal wetlands developed between 1m to 2m above sea level, and extending along the estuaries and around the lagoons, will be the coastal systems (natural as well as economic) most affected by the potential sea-level rise.

On the natural systems, developed on the intertidal estuarine zone, the impacts will be the noncompensated erosion of the higher mud flat, evidenced by the retreating microcliff and the progressive decrease of the salt-marsh surface (which is unable to migrate because of development on the inland border) and the submergence of the lower mud flat (slikke). Because 70% to 95% of the saltmarsh area has been reclaimed and transformed into salt ponds, ricefields, pastures, aquaculture ponds, urban and industrial agglomerations, harbors, and airports, the economic impacts will be considerable. Salt ponds and some aquaculture ponds will be submerged, and the rice field soils will be submitted to increasing salinization. Pumping the salt water to keep the systems functioning will be expensive because of the high cost of energy.

Estuarine harbors, as well as urban and industrial agglomerations and airports will be affected by increased erosion and flooding, especially the urban waste drainage systems. To the protect these systems, the cost will be very high because the most important cities of Portugal are located on the estuarine and lagoon margins.

THE CANTILEVER BARN IN UPPER EAST TENNESSEE AND SOUTHWEST VIRGINIA by J. Morgan, Emory & Henry College, Emory, Virginia 24327.

The southern Appalachian cantilever barn typically has ground floor log cribs and an overhanging frame upper floor supported by log beams or cantilevers. The lower cribs were used as animal stalls and the upper floor functioned as a hayloft. This barn type was identified by Glassie, who believed the structure diffused to the southern Appalachian region from southeastern Pennsylvania. Moffett and Wodehouse, however, have argued that the barn was invented in mid-East Tennessee, where large numbers of the structure remain on the landscape today. Recent fieldwork has revealed the presence of numerous cantilever barns in upper East Tennessee and Southwest Virginia. This paper compares the form and construction characteristics of upper East Tennessee and Southwest Virginia barns with those previously identified in the literature, and argues against an East Tennessee origin for the cantilever barn.

ADDRESSING ENVIRONMENTAL ISSUES: THE ACTIVATION OF MULTI-INTEREST COMMUNITIES by David Morley, York University, Toronto, Ontario M3J 1P3.

The long-established recognition that environmental problems have complex and interdependent dimensions crossing global, disciplinary, regional, jurisdictional, organizational, and community boundaries has not yet been matched by the development of consistent and effective institutional capacities to address such problems. This paper reviews ways in which action research -- a methodology that has been extensively applied within individual organizations -- can be used to create settings in which the fragmented communities of interest associated with environmental issues can be brought together to collectively design, plan, and activate continuing participation in the "multi-organizational domains" that form potential contexts in relation to environmental problems. The current application of this approach amid conditions of high uncertainty and growing public awareness and concern will be discussed. Two Canadian-based examples of action research that addressed critical environmental issues (Great Lakes' water quality and metropolitan waste recycling) are used to demonstrate and assess this alternative applied-research method, which is particularly relevant to learning and action associated with community development. Wider applications of action research will also be considered.

ON THE PERSISTENCE OF REGIONAL DEMOGRAPHIC VARIABILITY IN THE UNITED STATES by Richard Morrill, University of Washington, Seattle, WA 98195

Long term change in the demographic character of the United States, such as declining fertility, increasing longevity, declining household size, the aging of the population and decreasing family stability are well known, but less examined is the surprisingly great and persistent regional variability in these demographic characteristics. National tendencies toward convergence of per capita income, level of urbanization and occupational structure might suggest a parallel convergence in demographic character, but this has evidently not occurred. This paper first summarizes the basic dimensions of demographic character and its variability, which may be interpreted as a fertility-abortion dimension, a mortality-age structure dimension and a lifestyle-stability dimension. The paper goes on to show that variation in demographic character is not accounted for by degree of economic development, as indicated by income or urbanization, and finds it necessary to explore a wide variety of alternative associations, including long term historical cultural attitudes and beliefs.

THE GEOGRAPHICAL EXPERIENCE OF REFUGEES RESETTLING IN TORONTO: PRELIMINARY UNDERSTANDING, by J.K. Morris, Graduate Programme in Geography, York University, 4700 Keele St., North York, Ontario M3J 1P3.

The resettlement of refugees is an inherently geographical phenomena yet few geographers have become involved in its study. The experience of refugee resettlement has been considered through psychological, sociological and anthropological perspectives; geographers have not investigated this experience.

A pilot study using phenomenology, carried out by the presenter, recognizes the essence of the geographical experience of refugee resettlement as it emerged through conversations with two El Salvadorean refugees resettling in Toronto. Recognition of essence is dependent on entering a state of intuitive consciousness where phenomena are considered holistically as opposed to analytically. This perspective, used in considering transcripts of conversations with refugees, enables recognition of themes that enfold the whole of the phenomenon.

The essence of geographical experience, as it seems to be emerging, is the refugee's transition from being unsettled to being resettled. This is seen, for example, from refugees' theme of desiring a safe place to live. Upon resettlement, they experience regained confidence and control in their new home. Thus, the theme tells not only about safety and place but also the whole of the phenomenon: the move from being unsettled to being resettled.

THRESHOLD IDENTIFICATION BETWEEN ROCK GLACIER AND TALUS FACIES, INDIAN PEAKS, COLORADO by S.E. Morris, University of Idaho, Moscow, ID 83843, and G.A. Olyphant, Indiana University, Bloomington, IN 47405

A physically-based model for alpine lithofacies variation allows the formulation and testing of specific hypotheses regarding the nature of depositional environments of Holocene rock glaciers and talus deposits. The depositional setting of twelve deposits (7 talus and 5 active rock glaciers) within the Indian Peaks area of the Front Range was studied in detail to attempt identification of the topoclimatic threshold separating rock glacier and talus facies. This threshold can be identified using dimensionless measures of topoclimatic situation (containing elevation and insolation terms) and sourcewall area (itself influenced by bedrock jointing). The threshold "line" separating the facies along the two dimensionless variables is quite steep. This underscores the strong interaction between bedrock microstructure and talus shed attributes and topoclimatic situation in determining depositional environments within alpine valleys of the Southern Rocky Mountains.

DEVELOPING CLEVELAND'S WATERFRONT by Hunter Morrison, Director, Cleveland City Planning Commission, 501 City Hall, Cleveland, OH 44114.

Cleveland owes its existence as a national center of manufacturing and commerce to its location on the southern shore of Lake Erie at the mouth of the Cuyahoga River.

However, use of the lakefront for shipping and rail facilities has inhibited its use for people-oriented activities. Pedestrian access to the lakefront from downtown Cleveland is restricted by a freeway and rail lines as well as by topographic changes.

Plans prepared virtually every decade since the 1920's each called for development of facilities to draw people to lakefront activities; but it was only during the Great Lakes Exposition in 1936 and 1937 that this potential was fully, if briefly, realized.

The lakefront's fortunes began to change in 1982 when Cleveland's Mayor George Voinovich established a Waterfront Advisory Committee which worked with the City Planning Commission and a private consultant to produce a plan proposing development of a 7.5 acre inner harbor, a pedestrian promenade, a world class aquarium, a maritime museum, a glass-enclosed wintergarden and a festival retail market.

Following creation of a non-profit development corporation, construction of the inner harbor and pedestrian promenade was completed in 1988. Substantial completion of the proposed private development is anticipated by the City's 200th anniversary in 1996.

ECONOMIC IMPACTS OF THE CHANGING GEOGRAPHY OF HOME OWNERSHIP IN THE U.S. by Hazel A. Morrow-Jones, City and Regional Planning, the Ohio State University, Columbus, OH 43210-1320

Home ownership has been important in the United States as part of our national mythology (the American Dream) and because of its psychological value. However, it is probably home ownership's economic value that has encouraged its growth throughout most of this century. The economic importance of home ownership to individual households lies in its tax advantages, in the appreciation of house prices, and in the use of housing as an enforced savings plan for retirement. In addition, home ownership has a variety of multiplier effects that have important impacts on local and regional economies. The 1980s have seen a reversal of the long term U.S. trend of increasing home ownership. In addition, spatial differences in the movement of consumers into owner occupied housing are apparent at a variety of scales. This paper uses data from the Annual (American) Housing Survey to examine the changing rates of home ownership and spatial differences in those changes. It also examines the altered characteristics of home buyers and discusses some possible economic outcomes of this new structure of home ownership in the U.S.

BOARDING ARRANGEMENTS IN PENNSYLVANIA INDUSTRIAL TOWNS, 1900-1920 by Anne E. Mosher, Louisiana State University, Baton Rouge, Louisiana 70803.

Against an early-twentieth century backdrop of rapid industrial change, tensions emerged within industrial towns between a dynamic social-spatial division of labor and a more inert housing stock. As housing shortages became acute, some real estate speculators and manufacturers developed new residential tracts and subdivided existing structures for families. To meet the shelter demands of another group--young, unmarried, unskilled, and recently-arrived workers--other housing arrangements emerged based on boarding and lodging.

This paper focusses upon the variety of boarding arrangements found in Pennsylvania steel and coal towns between 1900 and 1920. Through the manuscript census, tax assessment records, deeds, and mortgage agreements it is possible to develop a picture of the social and spatial structure of boarding and lodging. Social surveys, novels and diaries augment this structural view with accounts of the everyday motives of, and relationships between, boarding agents and boarders. From these primary sources, it becomes clear that "traditional" boarding houses alone could not meet demands placed upon them. As a consequence, manufacturers encouraged the establishment of "boarding-boss" systems. At the same time, some families took in one or two boarders in order to meet more easily their rent and mortgage obligations. Boarding thus satisfied not only the immediate housing demands of a burgeoning workforce but the income requirements of working-class families as well.

STATE ECONOMIC DEVELOPMENT: BARRIERS TO EFFECTIVE POLICY EVALUATION by Anne K. Moss, Department of Political Science, University of Colorado, Boulder, Colorado 80309.

This paper addresses issues linking program effort and economic development success. A survey of the United States was undertaken that results in a compilation of economic development programs and tools, a comparison of the states as to what differences in effort exist as well as a comparison of different types of programs that dominate various regions of the country. Some of the questions this paper addresses are: What do we get for our efforts? How can we judge what's working? Is "successful" economic development dependent upon designing effective policies or implementing and evaluating programs? What is the new "War Between the States?" Is it worth waging and at what cost?

Preliminary results indicate that (1) the growth in program initiatives in the late 1980s continues to increase; (2) a continuing divergence in development, wealth and choices between the coasts and the interior of the country broadens and (3) states are forced to compete for business growth and revenues in ways that have both intended and unintended impacts on land use, environmental quality and human service provisions.

THE EVALUATION AND USE OF LAND RESOURCE DATA FOR REGIONAL DEVELOPMENT FOR REGIONAL DEVELOPMENT IN SULAWESI, INDONESIA by Michael R. Moss, University of Guelph, Guelph, Ontario N1G 2W1, Canada.

Although invariably cited as an absolutely essential component in any regional development strategy, land resource information is rarely effectively incorporated into the implementation process. The reasons for this failure may be seen to relate (a) to the lack of a clear scientific objective in either the data used or in the manner of its presentation, (b) the lack of trained personnel either to collect, analyze, or utilize the information, and (c) the failure of the decision-making process at the implementation level to have procedures requiring the use of the information. These issues are addressed in the context of the CIDA-funded Sulawesi Region Development Project now entering its second five-year phase in Sulawesi, Indonesia. The paper outlines the land resource classification procedures used, the range of training programs established, and the nature of the links between these and the regional development authorities at both provincial and district planning levels.

GENDER FORMATION IN WAGED LABOUR PROCESSES by Pamela Moss, Geography Department, McMaster University, Hamilton, ON L8S 4K1

Traditional marxist analyses of waged labour processes tend to emphasise objective conditions of class constitution and the contingency of gender. In this paper, I argue for a fused conceptualisation of class and gender. To accomplish this end I suggest that social relations in waged labour processes be investigated not only through class formation analysis, but also through gender formation analysis.

Gender formation is that set of historically mediated processes which constitute and are constituted by class and gender structures specific to that particular class and gender structure. Formation processes involve subjective experiences of class and gender relations, struggles over gendered class capacities, and objective conditions of subjectivity. I substantiate these conceptual arguments with data collected in a maid services franchise.

THE ROLE OF TERRAIN LONGWAVE ENHANCEMENT IN THE NET RADIATIVE BALANCE OF AN ALPINE GLACIER, by Keith R. Mountain, Department of Geography, Portland State University, Portland, Oregon, 97202.

Observation and simulation of the net radiative balance of a small, entrenched alpine-type glacier indicates that the longwave contribution from the surrounding terrain is significant in determining the distribution of the net radiation (Q^*) over the glacier. A surface net radiative model has been developed to explicitly incorporate a temperature dependent longwave radiation component from the surrounding terrain and is operational for various surface types contained within the skyline as visible from any point on the surface of the glacier for which flux estimates are required. Observations of all flux components that comprise Q^* were undertaken for several sites on and off the surface of Collier Glacier, Cascade Range, Oregon.

Model generated fluxes excluding the terrain longwave contribution results in significantly steeper gradients in the net radiation over the glacier. The effect of the terrain longwave component is to weaken the spatial distribution of the surface net radiation and result in a more uniform distribution of Q^* over the glacier despite the significant variation in topography and skyline for all points on the glacier. The modeled and observed results can be used to explain the pattern of the retreat of this glacier since the 1950's and the existing morphology of the glacier.

IMPLEMENTING AUTOMATED CARTOGRAPHIC NAME PLACEMENT ON THE CONNECTION MACHINE by James E. Mower, Department of Geography and Planning, State University of New York at Albany, Albany, New York 12222.

Mower (1989) notes that the execution time of a sequential name placement procedure for point features based upon spatially related backtracking procedures generally increases as a low order function of the density of features. As densit, increases, an increasing number of feature placements must be reevaluated upon the addition of a new feature, the repositioning of an established label, or the deletion of a feature.

Mower (1989) proposes a parallel algorithm for performing automated cartographic name placement on single-instruction stream, multiple-data stream (SIMD) computers. This paper will discuss the implementation of this algorithm on the Connection Machine, a SIMD computer from Thinking Machines, Inc., using the C* programming language, a parallel variant of the C and C++ programming languages. The Connection Machine programming environment, through the availability of large numbers of highly-interconnected real and virtual processors, can support the placement of names extracted from large, scale-independent data bases. The parallel implementation places names considerably faster than does a similar sequential routine and eliminates undesirable spatial ordering effects.

FEASIBILITY OF CANADIAN STORAGE FOR SALMONID RESTORATION IN THE US by Keith W. Muckleston, Oregon State University, Corvallis, OR 97331-5505.

The paper discusses the feasibility of expanding the number of water related outputs derived from cooperative transboundary management of Canadian storage in the Columbia basin. Both treaty and nontreaty storage are considered. Under a 1964 treaty the US shares hydropower and flood control benefits derived in the US that result from storage in Canada. The upcoming renegotiation of the Canadian Entitlement--power that Canada sold under the Columbia River Treaty--has stimulated preliminary discussion which includes efforts by fishery interests in the US to expand use of Canadian storage to enhance downstream migration of juvenile salmonids in the US. Energy interests on both sides of the border resist such expansion because it would reduce hydropower benefits. The US Bonneville Power Administration (BPA) must, however, comply with provisions of the Pacific Northwest Power Planning Act of 1980, directing BPA to participate in the restoration of fisheries depleted by development of hydropower. Since the extent and degree of BPA's fish restoration obligations remain open to interpretation, complex questions over joint management of storage in Canada are further complicated. The question of using nontreaty storage in Canada for fish migration has also arisen in the negotiations between BPA and BC Hydro, negotiations which originally dealt exclusively with hydropower. The inclusion of fish flows in US-Canadian cooperative management of storage is feasible but may well require innovative institutional arrangements.

INDIANA'S GLOBAL DESIGN MODEL FOR STATE GIS by Denis E. Mudderman, Department of Geography and Geology, Indiana State University, Terre Haute, Indiana 47809.

The logical goal for development of GIS at the state or province level is to produce a system with the greatest benefit and GIS capability at the overall least cost. In reality, many states have not been able to pursue this broad based structured coordinated logical approach. Several categories of state GIS efforts can be identified. In some states one or two departments, often the state Department of Natural Resources, develop GIS satisfying their own needs without much statewide coordination. Other states have coordinated efforts, but often the system is oriented to a major state problem or issue, such as planning, growth management, water resources, or land records modernization. There is always interrelatedness among state agencies and local county and city governments in problems and needs which government must manage, and interrelatedness in information flow. The broad perspective and the syntheses of elements to produce a logical whole is one of the benefits of a geographic approach to problems. By taking this "global" approach to state GIS and by lessons learned from the shortcomings and problems of other states a better system can result. The fact that Indiana is a relative latecomer in the development of statewide GIS results in a relatively clean slate where a fully global system is more possible. The result is a partially centralized and partially distributed system with input from all levels of government.

IMPLICATIONS OF SUSTAINABLE DEVELOPMENT FOR PLANNING AND IMPACT ASSESSMENT UNDER UNCERTAINTY by Tom Muir, Environment Canada, P.O. Box 5050, Burlington, Ontario. L7R 4A6

A major problem in assessing impacts of fluctuations is the view of economic development in which exploitation and expansionary growth are necessary and desirable. As a general strategy, this works only so long as the surroundings can stand the changes involved. When the environment as source can provide all the necessary inputs in sufficient amounts, and as sink, can easily disperse all harmful outputs, then development based on growth in scale may be possible. Since natural systems are dominated by laws of conservation, human activities that accelerate use of the environment as source and as waste sink cause degradation, and lead to loss of stability. Taken far enough, degradation and instability lead to a reduction in economy, and increasing uncertainty about future conditions. This situation more or less faces all interests now (e.g. power, transport), and is the cause of the major ecological problems that confront the Great Lakes and the world, (e.g. Brundtland Commission). The achievement of sustainable development (i.e. development sustainable over generations) requires new economies based on growth in the diversity and complexity factors of development capacity. These include: reorganized, novel, or more variable uses of existing capacity; new forms of capacity based on diversity and conservation to reduce waste and pollution; behavioural and institutional changes that promote conservatism, cooperation, mutualism, integration, anticipation and prevention. Fleet mix and rate diversity buffer impacts and reduce need to dredge; diversify power by integrating supply/demand, efficiency, conservation, joint venture, leases, user-pays - this buys a reduction in uncertainty, capital cost, debt, risk and overhead.

THE SPATIAL RELATIONSHIP OF A CALCUTTA SLUM, Anupa Mukhopadhyay, The University of Akron, Akron, Ohio 44325-5005.

The city of Calcutta, home to 3 million people, has over 25% of its land in slums. One of the old slums; Tangra, located at the eastern fringe, was surveyed in 1988. About 70% of the people were from out of state; 8% from Bangladesh and Nepal; 85% of the people had lived in the slum for less than 60 years; 75% of the households had been in Calcutta for three generations; an unexpected trend was noticed, with the increase in distance the number of people migrating increased; the slum was found to be a predominantly Hindu slum with 98.3% Hindus.

Scheduled caste and scheduled tribe formed 76.7% of the slum population; mean age of the head of the households was 53 years, heads of the households were usually males among 83.3% households; 53.3% of the heads were found to be illiterate; 40% of the households have income between $30-$60 a month.

An almost classic distance-decay function was detected in location of work place; shopping for non perishables, movie theaters, social call places, medical facility places.

COASTAL ZONE COLOR SCANNER: OBSERVATIONS OF SUBARCTIC NORTH AMERICA, by Theresa Mulhern, Department of Geography, University of Maryland, College Park, MD 20742.

The boreal forest-tundra ecotone is noted as a significant terrestrial bioclimatic boundary. However, the extent and location of the ecotone is quite uncertain. Historically, vegetation maps of the boreal forest-tundra regions of the globe were primarily derived through synthesis of scientific expedition observations. With the advent of photographic and electronic detectors, the capacity for geographic definition of this ecotone has been improved. Remotely sensed data, specifically acquired from the Coastal Zone Color Scanner, are sensitive to the variations in surface cover type which occur as transition is made from the vascular plant dominated boreal forest to the lichen and moss dominated tundra regions. Observations of subarctic vegetation, made from both ground and aircraft perspectives at field sites in Canada and Alaska, will be compared to observations acquired by the Coastal Zone Color Scanner, in order to illustrate the potential utility of satellite observations for mapping subarctic vegetation.

USER-ORIENTED RULE BASE GENERALIZATION FOR BASE MAP PRODUCTION by Jean-Claude Muller, Department of Cartography, ITC, 7500 AA Enschede, The Netherlands, and Diane Richardson, Canada Centre for Mapping Energy, Mines and Resources Canada, Ottawa, Canada K1A 0E9.

Scale reduction plays an important role in national atlas mapping. It includes the transfer of detailed information of larger scale maps to maps of smaller scale. In conventional mapping, scale reduction is achieved by eliminating line detail, modifying point density, and sometimes rearranging features. The objective is to maintain the graphic legibility and functionality of the map without losing the spatial characteristics of the features. In the digital environment, primary concentration lies with graphic legibility. These types of algorithms reflect an emphasis which has evolved in the digital development of generalization techniques.

In map production organizations, a more comprehensive approach is required for consistent portrayal of information at different scales. Accordingly, a rule base for the selection phase of generalization has been developed. It reflects base map production requirements as well as the information needs of a diverse user clientele, and takes into account the spatial relationship between geographic entities and contextual information. The rule bas was undertaken to see if consideration of production needs and map content provides generalization procedures more effectively than generalization based only on graphic presentation.

AGRICULTURAL MECHANIZATION AND RURAL SETTLEMENT IN WEST PARANÁ, SOUTH BRAZIL, Keith D. Muller, Geography and Planning, West Chester University, West Chester, PA 19383

This study of settlement geography focuses on the impact of agricultural mechanization in the western portion of the state of Paraná in South Brazil.

In parts of West Paraná private colonization companies have been responsible for the well-planned establishment of small- and medium-sized family-owned and -operated holdings. This contrasts with adjacent areas in the state where large and small holdings exist side-by-side and settlement patterns are haphazard due to lack of planning.

During the 1970's much of West Parana' changed rapidly from hand methods of cultivation in a hog-maize semi-subsistent economy to a highly commercial, mechanized system. In the 1980's diversified crop and animal combinations have appeared as recommended by agricultural support industries and cooperatives.

Of special interest to this study is the impact on rural settlement patterns from large-scale mechanized soybean farms which continue to displace the small-scale holdings. More particularily, will the small- and medium-sized family-owned and -operated holdings of West Paraná survive despite mechanization.

REGIONAL CLIMATES AND CLIMATE INFORMATION SYSTEMS by Robert A. Muller, Louisiana State University, Baton Rouge, Louisiana, 70803.

Interpretations of the climates of regions were not uncommon during the first half of the 20th century. The intent and scope of the published studies ranged from popular notions about the weather of a region, to scholarly monographs of regional climatic dynamics, to assembledges of [illegible] climatic statistics. Examples culled mostly from geographical literature are sampled.

In very recent years electronic technologies have encouraged the development of automated climatic stations, and near-realtime monitoring and interpretation of the status of climate in geographical frameworks beginning with a single site, extending out to regional networks, and beyond to global systems of analyses. This overview focuses finally on 6 regional climate centers that have been established recently largely to monitor and access regional climatic variability and change, and its environmental and economic impacts in the United States.

SANTA FE: A LANDSCAPE OF STYLE AND POSTMODERN TRANSFORMATION by Linda Mulligan, Department of Sociology, Ohio State University, Columbus, Ohio, 43210.

The purpose of this paper is to identify and discuss the socio-historical evolutionary process whereby the particular archetypical sociogeographic landscape of Santa Fe, New Mexico, has, over time, become more culturally metaphorical and mythical in the collective consciousness of American culture.

Utilizing Norton's discussion of religion and vernacular regions in cultural geography, it is possible to understand and conceptualize Santa Fe as both a spiritual and an esthetically stylized place. The rise and historical evolution of such a distinctive landscape can be traced to an integration of artistic and musical entrepreneurs financially enhanced by a population enclave of wealthy celebrities and scientists.

Critical to this paper is the identification of contemporary Santa Fe, with its uniqueness and vibrancy (and its resultant metaphorical imagery), as a geographic place of postmodern lifestyle transformation. Whereas Santa Fe has had a long association with native Indian cultures and their spirituality, the emergence of its identification with postmodern tranformational experiences pervades the entire sociocultural landscape. In the national culture, Santa Fe has thus become a placepoint and reference point for postmodern lifestyle change, and thus a critical landscape in understanding American culture.

LOCATION OF UNDERGROUND PETROLEUM STORAGE TANKS IN MACOMB, ILLINOIS, 1910-1989: AN HISTORICAL GEOGRAPHY

by Diane Mulville-Friel, Western Illinois University, Macomb, IL 61455

The cyclical history of petroleum marketing has increased and influenced the locations of abandoned gasoline service stations. A major problem with abandoned stations and their subsequent reuse is the risk of contamination due to leaking underground petroleum storage tanks. Many of these known and unknown tanks have begun to leak and pollute the soil and groundwater because they were not constructed of corrosion-resistant materials. Alteration of stations' above ground structures can remove evidence of abandoned tanks, and several reuses of the property may compound the problem. The purpose of this study is to examine the potential threat of a local hazard by reconstructing the historical geography of underground petroleum storage tanks.

Historic city directories, fire marshal records, Sanborn Fire Insurance maps, historic aerial photographs, and local public records were used to detail the pattern of gas station closure and reuse in Macomb, Illinois, from 1910-1989. This information, coupled with visual surveys and interviews, was used to assess individual site's contamination potential. All sites -- except where tanks had been upgraded to meet new regulations, or where site remediation had occurred previously -- displayed a level of contamination risk with tank age and construction material being major determinants. Other factors that influenced risk levels were time specific petroleum marketing techniques, and current and adjacent land uses.

SHARING THE VALLEY OF THE RED RIVER OF THE NORTH: IMPROVING THE USAGE OF THE THEME OF MOVEMENT IN CURRICULUM FOR SEVENTH GRADE SOCIAL STUDIES by D. Munski, Department of Geography, University of North Dakota, Grand Forks, North Dakota 58202

Once united as Lord Selkirk's land grant of Assiniboia, today's Valley of the Red River of the North is split between Canada and the United States. This fertile and highly productive agricultural region continues to be a significant transportation corridor between the Prairie Provinces and the Upper Middle West. Traffic especially is heavy between Winnipeg, Manitoba, and the North Dakota cities of Grand Forks and Fargo. Because of this situation, seventh grade social studies classes in Grand Forks begin the study of interconnections of the geography of Canada and the United States by examining the theme of movement through the home region of these students.

Social studies teachers in the Grand Forks public schools and geography faculty at the University of North Dakota are cooperating in curriculum development in geography in order to improve the historical geography aspects of this seventh grade program. Keeping this purpose in mind, research is focused upon interfacing historical maps, excerpts of various nineteenth century documents (notably diaries), with historical photographs to create a slide-illustrated classroom presentation. This presentation is given by a "visiting geographer" and emphasizes engaging the students in classroom participation. Based upon the results of student participation in the classroom activities, the conclusion of this project is that the next phase of curriculum development should emphasize post-World War One transportation changes and include field trips throughout this region.

FARMING FAMILIES IN UPLAND BRITAIN: OPTIONS, STRATEGIES AND FUTURES by Richard Munton, Department of Geography, University College London, London WC1H 0AP, England.

Some recent empirical studies of the social and economic restructuring of agriculture have sought to analyse the actions of farming families through their 'survival strategies'. This concept will be critically examined as a means of understanding farm-level responses to wider economic forces and as a vehicle for empirical enquiry.

The analysis will focus upon change between 1970 and 1988 in 150 farm businesses in upland Britain (southern Pennines and the Lake District) where the options open to farming families are restricted by the harsh environment and a dependence upon particular agricultural policies as much as general price support. Local and regional differences in response form an important element in the analysis in locations subject to similar policy treatment. An improved understanding of change at the farm scale is vital to the effective development of policy in such marginal areas, for both social and environmental reasons, in the emergent 'post-production' period of agricultural policy and practice in the European Community. Comparisons will be drawn with farming adjustment in more favourable agricultural regions.

CONFLICT OVER THE TRANS-NATIONAL MOVEMENT AND SITING OF WASTES by G. Tomas Murauskas, University of Wisconsin - Stevens Point, Stevens Point, WI 54481.

This paper examines the increasing incidence of conflicts involving the trans-national movement and siting of wastes. The purpose of this paper is to provide an inventory of recent conflicts of this nature, and to provide an overview of these conflicts in terms of their commonalities and structural characteristics.

A case example is used to demonstrate that conflicts involving the trans-national movement and siting of wastes typically involve three underlying characteristics: 1) A regulatory climate and/or public opinion in waste-donor countries that discourage the domestic siting of wastes; 2) an economic and/or institutional climate in waste-recipient countries that is attractive to waste generators in potential waste-donor countries, and 3) public recognition of the unfair imposition of environmental costs in waste-recipient countries.

ETHNO-NATIONALISM AND THE SOCIAL CONSTRUCTION OF PLACE by Alexander B. Murphy, Department of Geography, University of Oregon, Eugene, Oregon 97403.

Much of the literature on ethno-nationalism treats space and place as little more than geographical referents for particular peoples or groups. A significant challenge to this tendency comes from recent social and political theories that stress the importance of locality for the creation and sustenance of group attitudes and behaviors. Although recognition of the importance of a place-based perspective for the study of ethno-nationalism is growing, the concept of place itself remains vague. Place is often treated either as an abstraction or as an a priori spatial given.

The nature and scope of socially relevant places varies over time and space, of course. Yet at particular times and in specific locales, places have concrete conceptual and functional dimensions that reflect and influence ideas and actions. One of the challenges for a place-based perspective on society is to understand the nature and significance of these dimensions in particular contexts.

In political societies divided along ethnic or national lines, groups seek to advance competing notions of place. Socially relevant places are the outcomes of these struggles. These socially constructed places influence group identity and interaction; their role in defining the parameters of local context should not be underestimated. The pitfalls of overlooking the role of socially constructed places in plural societies is suggested by analyses of ethnolinguistic issues in Brussels that focus largely on distinctions between the status of Dutch and French speakers in the Belgian capital. Such analyses ignore the significance of the creation of Brussels as a place with a distinctive identity based on its linguistic heterogeneity, a process that is arguably fostering a greater sense of community in the city.

SEASONAL AND SPATIAL PATTERNS OF REGIONAL TOURISM ON VANCOUVER ISLAND, B.C. by Peter E. Murphy, Department of Geography, University of Victoria, Victoria, British Columbia, V8W 2Y2.

As tourism has become more competitive two aspects have become important to destination development that have particular relevance to geography, namely extending the season and developing regional products. This paper examines these temporal and spatial aspects, focusing on a twelve month monitor study that provides information on visitor origins and activity over the four seasons.

The paper notes there are significant differences in the types of tourist activity and their spatial movements over the seasons. Using this information it identifies certain areas where future planning and marketing strategies could benefit both the island's tourism industry and its host community partners.

SUSTAINABLE AGRICULTURAL DEVELOPMENT IN INDIAN HISTORIAL CONTEXT

by B. MURTON, University of Hawaii, Honolulu, Hawaii 96822.

One of the dimensions emphasized in the growing literature on sustainable agricultural development is the importance of programs which are highly specific to local ecological conditions, founded on a thorough knowledge of local agricultural practices, and are participatory in style. In India, such a populist approach has many advocates, yet to date official agricultural development has primarily been concerned with the introduction of new technologies and management practices through centralized planning. There are a number of reasons why this is so, but part of the answer lies in a set of attitudes about agriculture inherited from pre-Independence times. This paper uses historical material from Madras Presidency to document the emergence of two very different viewpoints about agricultural development. The first stressed the backward nature of Indian agriculture and from it derived a policy which emphasized the introduction of Western technology and practices. The second viewpoint focussed on the value of traditional technology, practices, and knowledge, and the policies advocated were precursors to contemporary ideas about sustainability.

However, the first viewpoint was dominant throughout the nineteenth and early twentieth centuries, and has been a powerful influence on post-Independence policy. Only recently since the term "sustainable agriculture" has permeated the agendas of international agricultural research and development organizations, has it become fashionable to stress the role that traditional practices and knowledge and local participation can play in the development process.

SPACE AND SOCIAL TRANSFORMATION IN MALINDI: THE GEOGRAPHY OF "POSTMODERNIZATION"?

by Garth A. Myers, University of California - Los Angeles, Los Angeles, CA 90024.

In recent years progressive geography has been in turmoil over new theoretical approaches to space and the relationships between spatial and social processes. The empirical study of socio-spatial relationships in particular contexts - especially in Africa - has received surprisingly little attention. The purpose of this paper is to demonstrate that analysis of the political economy of spatiality in Malindi, Kenya is crucial to an understanding of the explosive transformation of this town since independence. The peculiarities of Malindi's internal spatiality - and its connections and disconnections with the region, nation and world around it - reveal an illuminating interrelationship of space and society, intimately associated with the town's rapid ascent to a position of national economic and cultural significance. The patterns of spatial and cultural transformation in Malindi shed light on the complex processes at work in urbanization and capitalist development in Africa. Malindi is hotly contested ground - politically, economically and culturally. Analysis of the actors, mechanisms and institutions of the "contest" reveals the explanatory potential of a critical approach to space, order and disorder in "modernizing" capitalist societies.

SPATIAL CHARACTERISTICS OF THE SOVIET EMPIRE REVEALED BY GLANOST

by Robert R. Myers, West Georgia College, Carrollton, Georgia, 30118.

Patterns of change in the Soviet Union and Eastern Europe can be identified using the popular press as a data source. Changes that reflect glasnost and perestroika have developed rapidly into a complex pattern that represents the tremendous diversity of the Soviet Empire itself. The strife between the Armenians and the Azerbaijanis is an example of a conflict that predates communist rule and is just one of the numerous ethnic problems of the Soviet Union. The relaxation of border restrictions by Hungary and the East German response reveals the lack of cohesiveness among the Soviet Union's eastern European satellites. The rise of Solidarity to governmental power in Poland indicates that the relationship of the Soviet Union to its satellite states must be reexamined as well as the relationship of the Communist Party to the government structure The reporting of the national coal miners strike by the Soviet press is an example of the unprecedented openness since glasnost and perestroika were formulated. Though few people would consider the government press as open and candid, there is ample evidence that the policies of glasnost and perestroika were not just hollow words but were the harbinger of change, though how thorough or permanent is still to be seen.

THE SOCIAL PRODUCTION OF ECONOMIC DEVELOPMENT IN SOUTHWEST VIRGINIA

by Holly J. Myers-Jones. Department of Geography & Environmental Planning, Towson State University, Towson, MD 21204.

This paper examines the process of regional development from a political economy perspective. The on-going struggle to create a viable, growing, functional region in the Roanoke/New River Valley area of Southwest Virginia is examined. This struggle centers around the perceived need for economic development as defined by local power elites who have banded together to form various growth coalitions. The primary purpose of these coalitions is regional empowerment pursued through the twin strategies of core coalescence and hinterland expansion. As is urban areas, these growth coalitions often have competing goals - some of which are mutually exclusive. Unlike urban areas, however, the competition among growth coalitions threatens the achievement of the primary shared goal, i.e., the building of a sustainable functional region. The goals and memberships of growth coalitions are examined. Interviews with members of the power elite are analyzed with respect to their perception of the process of economic development and differing geographic configurations of the proposed region. The analysis emphasizes the construction of structural lines of power to facilitate the development process. The paper concludes that the development of functional regions in rural areas is very much a value-driven, socially produced process.

TERRITORIAL AND SPATIAL FORMS OF REGIONAL PLANNING : WESTERN THEORIES AND JORDANIAN EXPERIENCE,

by Yaser M. Najjar,Framingham State College,Framingham,MA. 01701.

The concentration of development in the capital region of Amman has recently become one of the major issues of regional structure of Jordan's economy.Therefore, a regional planning approach was adopted to achieve the decentralization of services and economic activities, and in turn improve the quality of living for all population regardless of thier residential geographical location.A number of regional development plans were completed by American,Japanese,West German and other Western planners assisted by local experts.Methods and concepts of these plans were originally developed for western settings.

The purpose of this paper is to analyze and evaluate the practice of regional planning in Jordan.Two research questions are asked:1)are these theories applicable to a Third World setting?,and 2)did Jordan achieve the goal of decentralizing its economic activities?.Reviewing the various development plans,territorial and spatial theories are identified which are totally inapplicable to Jordan.A trend series analysis is conducted to examine the changing spatial distribution of economic activities.The analysis reveals that spatial inequalities of Jordan's economy had not diminished.Jordan is still a country with a high degree of economic primacy concentrated in the Amman region.This region incorporates about 94% of economic establishments employing Five or more persons.

INSTITUTIONALLY PROMOTED AGRICULTURAL DIVERSIFICATION IN TEXAS

by Darrell Napton, Southwest Texas State University, San Marcos, Texas, 78666.

The Texas Department of Agriculture has initiated a program that encourages farmers and ranchers to produce different crops from those of the past. The goals of the program are to increase Texas agricultural diversity, to make the state's agricultural sector more responsive to market trends, and to create new jobs in regions that have high unemployment. The state is conducting marketing studies, helping develop market connections, educating farmers and ranchers, and providing loans for innovative enterprises and demonstration farms. Each of these efforts requires different institutional support. Some of these efforts encourage growing crops that are new to Texas; others encourage expansion of crops that have been minor. While these state initiatives may result in increased state agricultural diversification, participating farmers and ranchers may move toward increased specialization in hopes of gaining a more profitable market niche. Some of the diversification efforts will help economically depressed farmers by allowing them to use their land and labor in new, more profitable ways, other efforts will require new specialized equipment that may deter some individuals, while some diversification efforts are high capital, specialized enterprises that are beyond the knowledge and finances of all but the most wealthy.

FORCED MIGRATION AND ENVIRONMENTAL DISLOCATION: THE NEZ PERCE

by M. A. Narey, Lowry Technical Training Center, Lowry Air Force Base, Denver, Colorado 80230-5100

The reluctant sharing of North America between the Anglo-American majority and various minority groups has roots in United States policy toward Native American tribes dislocated by White expansion in the late 19th Century. The Modoc and Nez Perce, both Plateau tribes, were forcibly resettled in Indian Territory, where neither thrived. The Nez Perce, rich in natural resources and secure in their environment, experienced severe disorientation during and after the unforeseen move. Captive status and limited territorial extent precluded their familiar adaptive technique of seasonal nomadism. Historical and ethnographic accounts and comparative environmental data indicate that Indian Territory was seriously unsatisfactory on more than aesthetic grounds. Confronted with unfamiliar food, new diseases, inadequate shelter, and poor sanitation, the Nez Perce were overwhelmed by stress. They were upset by the new climate; differences in seasonal length, precipitation regime, and diurnal temperature range are significant. Adjustment to climate is a psycho-physiological process that can be delayed by stress. Total upheaval of a way of life generated great stress, and the Nez Perce completely failed to adjust. Absolutely convinced of the rightness of their traditional homeland, they could not change to fit the environment of Indian Territory.

LOCAL INITIATIVES IN PROVIDING EDUCATION FOR DEVELOPMENT: EXAMPLES FROM AFRICA.

By Anders Narman, University of Gothenburg, Box 3016, S-400, 10 Gothenburg, Sweden

This paper will present some comparative experiences from the third world. There has for a long period of time been an emphasis on local initiative in the development planning for marginal regions in the African context. This as opposed to an earlier trend of a stronger centralized planning.

In this paper some empiric cases of the provision of education to rural environments in Africa will be dealt with, primarily Kenya and Botswana. Even if both of these examples are supposed to develop the basic social needs in the areas, it is hard to find any kind of self-generating trends emerging. To a certain extent it is argued that these rurally based projects are plagued with the same problems as the centralized planned ones, i.e. management difficulties.

WORLD REFUGEES AND THE CANADIAN RESPONSE

by Alan Nash, Concordia University, Montreal, Quebec H3G 1M8.

This paper shows that Canadian refugee policy is not designed to meet the needs of the world's persecuted but merely to supplement Canada's carefully controlled immigration program. This argument is demonstrated by an analysis of the pattern of refugee admissions into Canada over recent years.

The paper first argues that the world population of refugees has reached a total of between 12 and 14 million people. Africa and the Middle East-South Asia regions now account for 28 percent and 47 percent, respectively, of this total and demonstrate that refugees have become a Third World phenomenon. However, as the analysis presented in this paper then shows, Canada's pattern of refugee admissions has stressed regions that are not major sources of refugees and has given relatively little attention to those regions that are responsible for 90 percent of the world's refugees. In 1986, for example, 31 percent of all refugees admitted into Canada were from Eastern Europe, whereas only 7 percent were from Afghanistan and Ethiopia.

Such a pattern, this paper concludes, is one that pays more attention to the asylum seekers' political background and economic potential for Canada than to their real needs for resettlement.

A SALIENT ASPECT OF "SHARING": FROM "TOMODACHI" TO TRANSNATIONAL THOUGHT MENTORS

by Peter H. Nash, Department of Geography, Faculty of Environmental Studies, University of Waterloo, Ontario.

Inasmuch as the word "**sharing**" is the salient ingredient in both conference themes, I have examined this process with reference to "**geographic thought**". Basically, this refers to the role of "mentors" who create ideas and ways of thinking. The processes involved are full of variety and are subjected to classification by **style** and **periods**. The "hottest" sharing is that of a "Tomodachi", (a Japanese word for "friend"), which was used by Haushofer to describe Ratzel as well as Hess. "Cool" mentors include Hartshorne, Sauer, and Whittlesey, and they can best be classified by style.

Canada's still "non-mature" mentor "profile" can be viewed in terms of periods: Mark I, Mark II, and Mark III geographers. Two giants who brought transnational geographic thought to Canada (**Mark I**) are the focus of a more detailed sample analysis: **Griffith Taylor**, the anglophone founder, and **Raoul Blanchard**, the francophone counterpart. Taylor, as Antarctic scientist and promoter of environmental determinism was a highly influential pioneer, with many disciples. Blanchard had an equal impact via importation of thought seeds, not only as methodologist, but also as a regionalist and networker. He eschewed philosophical interpretations. The "Mark I" are original importers (colonizers), but they did not stay in Canada. These progenitors were followed by the **Mark** II contributors: II **A** - born in Canada, who received their advanced geographic education elsewhere, and II **B** - born outside of Canada, but came to Canada with thoroughly developed geographic thoughts and settled permanently.

A **Mark** III generation (born, educated, and permanently residing in Canada) is now maturing. It can better be understood by a "classification of mentors", which also assists in explaining the sprouting of epistemologies, as well as new paradigms to come! It is also a simple teaching device, effectively used and tested by me with hundreds of students in a required "Nature of Geography" course. It highlights a salient aspect of "sharing".

THE KANO PALACE: A PRE-COLONIAL SETTING IN A POST-COLONIAL CONTEXT.

Heidi J. Nast, McGill University, Department of Geography, 805 Sherbrooke St. West, Montreal, QC, Canada H3A 2K6.

The urban area of Kano was the largest commercial area of Hausaland and one of the main West African entrepots of trans-Saharan trade and Hausa industry during pre-colonial times. The British occupation of Kano (1903 to 1960) led to dramatic political and socio-economic changes that initiated a restructuring of power relations between traditional interest groups and between these groups and their colonial overlords. The changing power relations are acutely reflected in the spatial transformation of the content and composition of the traditional landscape of the walled cities throughout Hausaland.

A microcosmic register of these changes is the Kano palace, the root of traditional authority and order of Kano Emirate. The latter was one of the most powerful city-states of Hausaland, and one boasting an exceptional architectural tradition. By using the palace as a kind of text, we interpret the ongoing demise of the traditional landscape, not in terms of ideal changes in individual taste or choice, but as a reflection of changing relations of power resulting from crisis precipitated by foreign interests within a global context. These changes are the basis of a rupture in traditional cultural values that have enabled the sustained participation of Hausaland in the global economy.

CONSERVING AND EXPLOITING TROPICAL FORESTS: COSTA RICAN FORESTRY RESERVES

by Katie Nava, University of California- Los Angeles, CA 90024.

The purpose of this study is to examine subsistence farming in protected natural areas, an activity both practical and problematic in many tropical countries. The central question is : what happens to the farmers and the forest as a result of their combination? The spatial and social processes of frontier settlement and export agriculture form the context of the study question.

Twenty-three farmers were interviewed from two Costa Rican forestry reserves to examine the farmers' perspective. This information is compared with theory of sustainable development, with government literature, and interviews of officials from Costa Rica.

Conventional mixed farming practiced throughout the country is no longer permitted in the reserves. Essentially, farmers' income alternatives associated with the forest are eliminated in the name of conservation. This pressure relates to a larger political and economic relationship that locks farmers into a cycle of poverty and environmental degradation. The state Forestry Service has not mitigated this problem because its workers belong to factions that either a) endeavor to help the farmers but are hampered by fiscal and infrastructural limits; or, b) have a stake in the status quo.

COASTAL ZONE MANAGEMENT: MEDIA MYTHS AND TRUTHS by Roger D. Needham, Department of Geography, University of Ottawa, Ottawa, Ontario K1N 6N

Costal Zone Management has been the focus of much print media attention, particularly in the Great Lakes' basin. A significant proportion of this reporting and editorialization in the 1951-1986 research period has been related to society's short, medium and long term adjustment to natural hazards. In this context, this paper comprehensively addresses the companion questions: What themes or issues have dominated newspaper coverage of the coastal zone management process in Canada and the United States? Do the residual messages left by this coverage imply that new or modified public information strategies are needed for resource managers and environmental reporters? The answer to both of these questions is shown to be the 'affirmative'. In conclusion, a series of recommendations is offered both managers and reporters in order to improve the content and timing of their information products.

RESTRUCTURING THE RELATIONSHIP BETWEEN RURAL LAND USE DEVELOPMENT AND THE ENVIRONMENT: A UNITED STATES PERSPECTIVE by M. Duane Nellis, Kansas State University, Manhattan, Kansas 66506.

Rural America consists of nearly 84 million hectares, thousands of administrative jurisdictions, and some 60 million people who live in a diversity of geographic regions, economic conditions, and changing land use patterns. The variety of America's rural areas-from remote wilderness to the rapidly expanding urban-rural fringe-has resulted in a high degree of programmatic idiosyncrasy. Many rural areas have been lax in protecting natural areas and enforcing environmental laws. Rural areas often lack adequate public funds for the monitoring and enforcement of environmental regulations. While sustainable economic development coupled with effective management of the environment is a worthy goal, extensive poverty and stagnant economies cause rural areas to place economic development efforts far above environmental protection priorities.

In the past two decades, however, congressionally mandated environmental land use policy has resulted in a framework for major restructuring of America's rural land use patterns. The National Environmental Policy Act, the Federal Land Policy and Management Act, the Clean Water Act, and the Food Security Act, in conjunction with state and local land use planning regulations have had long-term influence on how lands will be used. Environmental problems associated with loss of wetlands, groundwater depletion, reduction in shelterbelts, and conversion of prime agricultural lands, however, continue at an alarming rate.

THE ZERO CURTAIN EFFECT: HEAT AND MASS TRANSFER ACROSS AN ISOTHERMAL REGION IN FREEZING SOIL by Frederick E. Nelson, Department of Geography, Rutgers University, New Brunswick, NJ 08903, Kenneth M. Hinkel, Department of Geography, University of Cincinnati, Cincinnati, OH 45221, and Samuel I. Outcalt, Department of Geological Sciences, University of Michigan, Ann Arbor, MI 48105.

The term *zero curtain* refers to the effect of latent heat in maintaining temperatures near 0°C over extended periods in freezing or thawing soils. Analysis of thermal data from an arctic site and a midlatitude location suggests that the phenomenon may be a universal characteristic of wet, medium textured mineral and organic soils during freezing. Non-conductive processes play an important role in formation and maintenance of the zero-curtain effect. The term zero curtain is applicable to locations outside permafrost regions, but units of measurement should not be assigned to it.

THE NATURAL VILLAGES OF SOUTH KOREA by David J. Nemeth, Department of Geography and Planning, The University of Toledo, Toledo OH 43606

South Korean farmers are leaving the countryside for the cities at an average annual rate of 450,000. Thirty-five thousand troubled villages remain in their wake. One possible interpretation for village decline is that these are natural villages and that they are dying natural deaths. This mystical notion is explored here, using primary and secondary sources, including materials from field work in South Korea.

The quaint and enigmatic term "natural village" is encountered in a variety of South Korean agricultural and rural statistical summaries. Examination of the natural village concept entails a cross-cultural discussion that is instructive from an ethnogeographic point of view because it presents an indigenous perspective on Korean villages that receives little attention these days. South Korean natural villages are introduced as traditional settlements, having spontaneous origins, and persevering through time according to their own internal necessity. Animation of Korean villages is appropriate in the context of a geomantic (p'ungsu) reasoning that prevailed in Korean society during the long dynastic era. According to this perspective a natural village responds favorably to the seasonal rhythm of cyclic change, while non-cyclic change can be life threatening to a natural village and to its inhabitants.

Overwhelming non-cyclic change occurred throughout rural South Korea after 1970. All natural villages were systematically transformed into "new" villages, and thereafter enervated by overly exploitive state economic planning. The life support system of a new village is so highly artificial that its existence can only be maintained by the external necessity of the modernizing state. The current demographic trends indicate that the spontaneity and internal necessity that once gave natural villages their integrity are gone.

CHARACTERISTICS OF PRIMARY, RETURN AND ONWARD MIGRATIONS OF THE CANADIAN INTERPROVINCIAL SYSTEM: 1976-81 by K. B. Newbold and K. L. Liaw, Department of Geography, McMaster University, Hamilton, Ontario L8S 4K1 Canada.

Our main purpose is to search for meaningful patterns from a set of well-defined migration measures so that plausible hypotheses about the effects of past migration experiences on current migration propensities can be generated. We examine the patterns for different age groups as well as the total population so that the variation in these effects with age can be revealed.

From the information on (1) the province of birth, (2) the 1976 province of residence, and (3) the 1981 provinces of residence in the Public Use Sample of the 1981 Canadian census, we find the 1976-81 out- and in-migration rates of each province for: (1) primary migrations (those leaving the province of birth); (2) return migrations (those returning to the province of birth); and (3) onward migrations (those with neither origin nor destination being the province of birth).

Both out- and in-migration rates are well-defined in the sense that they are computed with the denominator being the **at-risk population** (i.e. the pool of individuals who have the **potential** of being included in the numerator). For example, the denominator for the in-migration rate of Ontario **excludes** all the individuals who resided in Ontario in 1976.

Preliminary result suggests that past migration experience has a greater effect on the spatial variation of out-migration rates than on that of in-migration rates.

SLEEPING LANDSCAPES: HISTORIC SITES WHERE TIME STANDS STILL by R. M. Newcomb, Department of Geography, California State University, Northridge, California 91330.

In many parts of the world one can encounter sites composed of single structures, complexes, or entire landscapes which appear to be places where Time has stood still. There is a range of types of such sites in terms of their antiquity, size, and urban or rural locale. The historical geographical stories which these sites represent range from pre-history to the present, and from monumental constructions to sites in the countryside which reflect many layers of landuse. One can study such timeless places by inquiring about their real historic worth and their potential usefulness in illuminating it. Site or structural preservation may be one way to illuminate. Pedagogic development may be another, as may their use as inspirational vistas. How can such sites best be managed, from the viewpoint of applied historical geography? Benign neglect frequently is the best answer, since unintended care has often apparently been sufficient. A more active and common management program converts structures into "house museums" which can be visited and which may be combined with working displays to explain the time dimensions present there. Scheduling as an historic monument or inclusion within an urban historic district are two additional legalistic management techniques. If one is dealing with a rural area, then emparking in a way which will combine preservation with productive contemporary use may be the best answer. Sleeping Landscapes are part of the human legacy of our Globe, and as such they deserve our serious attention.

ROCK GLACIER RELATIVE AGES AND FABRIC DEVELOPMENT IN THE LA SAL MOUNTAINS, UTAH

by Joseph W. Nicholas, Department of Geography, University of Georgia, Athens, Georgia 30602

Rock glaciers have been of limited use in paleoclimatic reconstruction both because they have a largely unknown response time to climatic change, and because the response itself can vary. The use of many relative age techniques on rock glaciers is problematic because of the fact that, when active, they flow, and flow may disrupt such age indicators as lichen and soil development. Furthermore, many relative age techniques are dependent on the measurement of response variables whose rates of development change with variation in climate. This study reports on the results of an attempt to develop a dating technique for rock glaciers that is not affected by climatic change.

Several techniques are used to assess relative ages of 14 rock glaciers in the La Sal Mountains. Lichenometry and rock weathering data of several types are compared to fabric development as a test of the hypotheses that 1) characteristic fabrics develop during rock glacier flow; 2) fabric strength decays when flow ceases and internal ice melts; and 3) fabric analysis may thus be used as a dating technique for late Quaternary rock glacier deposits. Clast fabric analysis focused on subsurface fabric at 24 standardized locations. Rock weathering data include weathering rind thickness and hardness, the latter being measured by the Schmidt hammer. The use of lichenometry was found to have serious drawbacks in the La Sals due to the mode of weathering associated with the dominant rock type.

INTERACTION PATTERNS OF BLACK DOCTORATES WITHIN GEOGRAPHY

by D. R. Deskins, Jr., The University of Michigan, Ann Arbor, Michigan, 48109, and W. W. Nichols, Jr., North Carolina Central University, Durham, North Carolina, 27707

Nationally during the 1980s black recipients of doctorate degrees declined sharply after peaking in the 1970s. There is reason to believe that this national decline in black doctorates is paralleled in geography. Although the numbers and overall graduation and employment patterns of black doctorates in geography over time is an interesting topic in its own right and is a component of this study, the primary focus is on an examination of the types and patterns of black interaction within the discipline. This is a time in our national history when race relations are severely strained and the merits of affirmative action are being challenged almost daily in nearly every arena where human interaction occurs. It is also an opportune time to see how the discipline of geography, which once had taken the lead in increasing black participation and is once again moving in that direction, has reacted to these external trends. This and other related questions are addressed by analyzing data from a national survey of black doctorates in geography, the National Center for Educational Statistics, and the U.S. Bureau of the Census. The discipline's response to blacks' participation, as identified in this study, serves to educate and is useful as geography develops strategies for the future and faces changes in the composition of the nation's population, where ethnic and racial minorities are forecast to account for one-third of the population by the year 2000 and as high as 45 percent by 2050.

KNOWLEDGE ENGINEERING FOR CARTOGRAPHIC GENERALIZATION: A CASE STUDY

by Bradford G. Nickerson, School of Computer Science, University of New Brunswick, PO Box 4400, Frederickton, New Brunswick, Canada E3B 5A3.

The Canadian National Topographic Series of maps includes scales from 1:1,000,000 up to 1:25,000. Base maps at a scale of 1:50,000 serve as the principal map data base from which the 1:250,000 scale maps are derived using cartographic generalization. This paper documents an initial attempt to capture the knowledge brought to bear on the cartographic generalization problem by experienced cartographers at the Canada Centre for Mapping in Ottawa. A preliminary knowledge base of rules and the objects about which those rules reason is discussed, along with the demands automated cartographic generalization using a knowledge base approach would make on the underlying structure of digital map data.

URBAN ENTERPRISE IN EASTERN ONTARIO, 1849-1920: A CASE STUDY OF THE INSTITUTIONALIZATION OF DEVELOPMENT POLICIES.

Heather Nicol, Department of Geography, Queen's University, Kingston, Ontario. K7L 3S6.

Between 1849 and 1920, Ontario developed a significant cadre of legislation designed to stimulate, organize and regulate industrial development within the province. This changing legislation, while studied extensively by those interested in its economic impact, has rarely been examined from the perspective of the role of municipalities in effecting institutional change at the provincial or national level of government. This paper discusses the evidence for treating culture as a negotiated resource, and the relationship between "cultures of urban enterprise" so well documented in the booster literature, to "cultures of public enterprise", institutionalized at the level of provincial government.

GLOBAL PATTERNS OF HUMAN RIGHTS VIOLATIONS,

Bernard Nietschmann, Department of Geography, University of California, Berkeley, CA 94720.

All individuals and all peoples in the world have certain basic rights regardless of where and under what form of government they live. Widespread recognition of human rights and condemnation of their violation are a rather recent and evolving development in international law.

But two conflicting concepts fundamental to international law limit the protection of human rights and are used as a pretext for their frequent violation: the rights of sovereign state, and a people's right to self-determination.

Most of the world's 3000-5000 distinct peoples and their nations do not consent to live under the subjugation of the world's 168 states. The conflicts that result produce 76% of the world's wars, most of the refugees, almost all of the genocide, and much of the human rights violations.

International laws either conflict over or avoid the sub-state territorial and national identity conflicts that account for the majority of the violations.

Examination of the geographic patterns of human rights violations provides an alternative understanding of their reasons and solutions.

DESCRIPTIVE MODELS OF SOUTH ASIAN CITIES

by Allen G. Noble The University of Akron, Akron, Ohio 44325-5005.

Geographers and others have long wrestled with the problem of classifying and analyzing South Asian cities. In the process they have attempted to use a variety of economic, morphologic and mathematical models. With regard to urban form the difficulties have been especially manifest. That such urban areas are not like Western cities, and hence not within the purview of western urban morphology models, such as the concentric zone, wedge or sector, and perhaps even the multiple nuclei, is well recognized. The few descriptive models which have been devised to explain South Asian city structure do not seem to have received widespread acceptance. An important element explaining this lack of adoption may be that these models are not universal in their application to south Indian urban centers.

This paper offers two generalized descriptive urban models which have wide applicability and thus may be used to classify and explain the morphology of South Asian cities. The first model is the more general, and is most appropriate for many Indian urban areas. The second model has more specific application to cities of south India.

Both models attempt to explain Indian urban structure and form as it existed roughly at the time of Independence (1947) and in the two-three decades following that time.

TODA HUTS AND HOUSES (THE NILGIRIS, SOUTHERN INDIA),

by William A. Noble, University of Missouri, Columbia, Missouri, 65211.

There are now only thirteen of the traditional Toda barrel-vaulted huts left. Of these, two are reverse-facing with each sleeping platform then placed on the opposite side of the hut (thus revealing the strong emphasis upon sleeping in the northerly side). Fewer of the traditional front-gabled huts are left. All the huts have the same interior organization: sleeping platform to one side, and an adjacent mortar hole within the other side which divides the back female section with fireplace from the front male section with milk churner. A fireplace is either to the right or left, with all else in each interior in conformance. Ecologic change in the Nilgiris is linked to the massive plantings of introduced trees on the grasslands and the large number of settlers who have spread into many areas since W.W. II. It has thus become increasingly difficult for the Toda to obtain the rattan cane, bamboo and a species of grass used in hut construction.

Governmental financial aid has made it possible for the Toda to obtain more substantial houses, and most now live in such houses. The smaller non-traditional houses, and especially if they are free-standing, have the old traditional interior organization incorporated within. When the Toda built larger houses within rows, like their Badaga neighbors, they tended to incorporate the interior organization of Badaga houses. Thus, most of these houses can be labeled as half-Badaga or full-Badaga types, with fireplaces to either the right or left. While a half-Badaga house is only one room wide, the full-Badaga house is two rooms wide. In any mention of Badaga houses (including a continued emphasis upon right versus left), however, we must remember that the basic functional organization in such houses was originally inspired by the manner in which the Toda had earlier organized the interiors of their huts.

Because the size and organization of a house should offer some indication of the increased degree to which Toda have joined the general pan-Indian culture, it is noteworthy that the two Toda families with the largest houses have television sets and males who ride around on motorcycles. Another large house, which should be completed by now, is owned by a Toda who works for the Hindustan Photo Film Factory and who thereby obtained a substantial Governmental loan which enabled him to build his new home. The three houses are dominated by interior organizations which reveal marked departures from the traditional.

Because they pursued fresh cultural ways from the start, the Christianized Toda gave up dwelling in traditional huts. While some of their houses display some Badaga influences, they do not generally conform to the half- or full-Badaga types.

CHRISTIAN PILGRIMAGE TRADITIONS IN INDIA

by M. L. Nolan, Department of Geosciences, Oregon State University, Corvallis, Oregon 97331.

This paper focuses on the characteristics of 150 Christian pilgrimage centers in India. Although primarily concentrated in the southern states of Kerela and Tamilnadu, Christian shrines are found in all parts of modern India. Several of these holy places are sacred to Hindus, Muslims, and Buddhists as well as Christians. Christian shrines in India are categorized by type and compared with Christian pilgrimage sites in other parts of the world as well as with Hindu, Muslim, and Buddhist shrines in India. About one third of the shrines that can be dated were established prior to the turn of the nineteenth century. Some of these claim to have been associated with the legendary missionary activities of the apostle Saint Thomas in the first century A.D. Nearly half of the Indian shrines, however, were founded after 1900 as compared with only 5 percent of the active shrines in Western Europe. Several of the other variations in general pattern between Indian and European shrines appear to be related to the relatively large proportion of Indian shrines formed within recent years, an hypothesis that is tested by comparison of the Indian and European data with shrines in those parts of North and South America where a majority of pilgrimages have been established since the turn of the twentieth century.

STRATEGIC LOCATIONS FOR VEHICLE INSPECTION STATIONS ON HIGHWAY NETWORKS

by Valerian T Noronha, Department of Geography, University of Alberta, Edmonton AB, T6G 2H4

Heavy vehicles can create safety and maintenance problems on highways. Provincial transportation departments operate vehicle inspection stations along important highways to enforce maximum-weight and other regulations.

This paper deals with strategies for optimal location of a set of inspection stations on a network. Optimizing objectives are first identified: they include minimizing costs of construction and operation, and maximizing effectiveness in deterring and detecting violations. Motivations behind route choice are then examined, and measures of link value derived.

The remainder of the paper presents algorithms to identify the set of links in the network that are most suitable for the location of inspection stations. Typical network characteristics are generated on a simulated data set, and the results of the optimization algorithms examined. The methods are then illustrated on a realistic problem.

FOSTERING GEOGRAPHIC LITERACY WITHOUT STERILE PLACE-LEARNING: SOME EXAMPLES

by D. Norris, Geography, S.U.N.Y. Geneseo, N.Y. 14454.

Continuing national concern about widespread geographic illiteracy in the United States has prompted several remedial approaches within and outside Geography, including a raft of commercial products incorporating place learning as their principal 'benefit.' The discipline faces the problem that such unstructured context-free general knowledge is quickly forgotten, makes for an extremely arid teaching and learning experience, and is eerily reminiscent of turn-of-the-century rote learning approaches to geographic education. Little wonder then that the growing movement to promote geographic awareness once again risks a parallel developing public and even scholarly perception of geography as only knowing about places.

This paper reports four stratagems used to foster context-specific geographic awareness in a college introductory human geography course with a total annual enrollment of more than 600 students, for nearly all of whom the course is their first formal exposure to the discipline. The stratagems are: systematic analysis of geographic illiteracy and its roots; specific evidence for and analysis of mass media geographical bias in global news coverage; structured treatment of current affairs requiring atlas consultation; and a class-wide inventory and consequent discussion of the origins of students' personal effects, with graphic and immediate implications of global economic interdependence and comparative advantage. The merits and demerits of each stratagem are discussed.

MAQUILADORAS: SPATIAL AND TEMPORAL CHANGES IN THE U.S.-MEXICAN IN-BOND INDUSTRY.

by Robert E. Norris
Geography Department; Oklahoma State University, Stillwater, Oklahoma 74078

Maquiladoras are Mexican industrial plants where parts made in the U.S. are assembled into finished and semi-finished products that are subsequently returned to the U.S. market. This bi-national program, called the "in-bond" or "off-shore" industry, was started to: (1) help stem the flow of illegal entries into the U.S. by Mexican nationals, and (2) take advantage of the low labor costs in Mexico by U.S. industries. The number of maquiladoras has increased dramatically over the last twenty years to a 1989 total of about 1500. Nearly every Mexican border town now has a maquiladora, and the plants range in size from small 5-10 person operations to huge facilities employing thousands.

The focus of this paper is on the changing spatial arrangement of maquiladoras, especially within the larger Mexican border cities. Locational planning within industrial parks has taken over from the once non-planned, seemingly random site selection, and Japanese owned maquiladoras have influenced the regional arrangement. Mexican planning and Japanese entry into the industry have created political repercussions such as the need for new border crossing points and other transportation facilities, as well as creating changes in the Mexican landscape. The methods used in the research are map and statistical analyses of data collected by the author.

PERESTROYKA AND THE SOVIET TRANSPORTATION SYSTEM

by R. N. North, Department of Geography, University of British Columbia, Vancouver, B.C., Canada V6T 1W5.

The paper examines the impact of perestroyka on the Soviet transport system and traffic flows. It is based on a survey of recent articles in Soviet technical-economic journals and on interviews with Soviet administrators and researchers.

Some of the economic and managerial reforms favoured under perestroyka are peculiarly difficult to apply to transport, and the effects of others are hard to distinguish from those of reforms already under way when perestroyka began. Nevertheless we can distinguish initial impacts of perestroyka in the transport sector itself as well as the effects on transport of perestroyka in other sectors. Particularly traumatic for transport administrators have been losses of traffic along some routes and the expectation of further losses, and the need to justify capital expenditures on economic grounds. Reactions have ranged from hasty withdrawal from ventures perceived to carry any risk; to new initiatives in transport; to the diversion of funds and labour to activities expected to be more profitable than transport.

There are also indications of longer-term effects of perestroyka. The paper examines attitudes to technology especially that employed in northern transport; attitudes to intermodal co-operation; the scale and direction of traffic flows; and pressures for further perestroyka.

HYPERMEDIA, AUTOMATED MAPPING, AND SPREADSHEETS AS MICROCOMPUTER TOOLS FOR GEOGRAPHIC LITERACY by Robert Nunley, George Ulbrick, and Robert Wood, Geography, University of Kansas, Lawrence, Kansas 66045

As MicroComputers went from quaint oddities found in the offices of a few "new-gadget lovers" at the beginning of the 1980's, to one in every departmental office at the beginning of the 1990's, three groups of tools came into our professional hands which, when effectively employed, go a long way towards making our efforts to improve geographic literacy more effective and more enjoyable. HyperMedia is making it possible to "navigate" one's way through text, maps, tables, and photographs as one "explores" efficiently large quantities of information such as a basic textbook; we are currently teaching our initial course in Human Geography with a HyperCard version of Rubenstein's text, and we have under preparation a color version in SuperCard and PC versions in HyperPad and one not yet announced. (They are on display at the Merrill Publishing booth.) Automated Mapping is putting very sophisticated cartographic capabilities into the hands of every MicroComputer owner, and increasingly they're using them; we are using AtlasGraphics on the PC's and MapMaker on the Macintoshes with students at all levels, including special seminars for professional, business, and service offices. AtlasExplorer automates the teaching of basic geographic facts in an absorbing way with astonishing results--for the first time students are enjoying that part of our courses as much as the "analysis" of the facts. SpreadSheets continue to be the ideal synergistic sandbox for geographers to describe, simulate, and analyze processes--Wingz for the Macintosh even combines the advantages of HyperMedia with those of the SpreadSheet! A major challenge of the 1990's will be to learn how to use these tools (and how to use the new ones which will come cheaper, easier to use, and more flexible) while holding on to the fundamental concepts of the discipline.

SUITABLE REPRESENTATION SCHEMES FOR GEOGRAPHIC INFORMATION ABSTRACTION by Timothy L. Nyerges, Department of Geography DP-10, University of Washington, Seattle, Washington 98195.

Geographic information abstraction is a synthesis of database abstraction and map generalization. Database abstraction literature has focused on data management of nonspatial characteristics while map generalization has focused on analytical processing of spatial characteristics. A systematic approach for dealing with a simultaneous and/or independent change in resolution of spatial and nonspatial characteristics is needed. Procedures and structures that provide geographic information processing for both general-to-detailed and detailed-to-general levels of resolution are needed to support interactive cartographic modeling. The integration of database abstraction and map generalization suggests that management of a knowledge base for analytical processing is both possible and necessary. A fundamental concern in developing a large knowledge (rule) base for geographic information abstraction concerns knowledge (rule) management.

ELEMENTS OF GEOMETRIC ROUTING THEORY -- II. Sandra L. Arlinghaus, Director, Institute of Mathematical Geography, 2790 Briarcliff, Ann Arbor, MI 48105; William C. Arlinghaus, Asst Professor of Mathematics and Computer Science, Lawrence Technological University, 21000 West Ten Mile Road, Southfield, MI 48075; David Lantrip, Graduate Student, Ph.D. Program in Urban, Technological, and Environmental Planning, University of Michigan; and John D. Nystuen, Professor of Geography and Urban Planning, University of Michigan, Ann Arbor, MI 48109.

The 1989 AAG poster entitled "Elements of Geometric Routing Theory" (S. Arlinghaus and J. Nystuen) contained panels illustrating how theoretical/mathematical material from graph theory, Manhattan-street geometry, fractal geometry, and Steiner tree geometry might be employed in routing strategy. In this follow-up, we illustrate the detail of:

1. a newly-computerized Heditniemi matrix algorithm to find, simultaneously, the shortest network distances from an entire vertex set to itself:

2.. a metrization of a curvilinear transformation of known results about routing through Manhattan street geometry;

3. fractal design and routing through a marina -- technical material;

4 route compression using Steiner trees.

LABOR AND THE INTERNATIONAL TRANSFER OF JAPANESE WORK ORGANIZATION by Ann M. Oberhauser, The University of Toledo, Toledo, Ohio 43606.

The geographical restructuring of industry has intensified in recent decades with the increased mobility of capital across regional and national borders. In many instances, international capital is attracted to areas with cheaper costs of production and expanded markets. Regional and local work forces are significantly affected by this foreign investment as they adapt to new work organizations and different labor relations.

Japanese industry is one of the leading forces in global economic restructuring. This paper examines how Japanese automobile transplants influence the social and spatial organizations of industry in North America and Western Europe by locating in rural greenfield sites and employing non-traditional auto workers. Japanese automobile firms tend to employ workers who can adapt to flexible labor practices and few job classifications. This work organization contrasts with the more rigid work and multiple job classifications utilized in Fordist assembly-line production.

The transfer of Japanese production to North America and Western Europe is sending a wave of change through labor relations and work practices in the automobile industry. This study analyzes the geographic patterns and social organizations associated with Japanese production in North American and West European Japanese auto transplants. The findings will inform labor, industry and government about the changing geography of automobile production and particularly the implications for regional labor.

INSTITUTIONS SHARING GEOGRAPHIC INFORMATION: PROSPECTS AND STRATEGIES by Nancy J. Obermeyer, National Center for Geographic Information and Analysis (NCGIA), 107 Boardman Hall, University of Maine, Orono, Maine 04469.

As the development of Geographic Information Systems progresses, and technical problems fall by the wayside, new problems take center stage. One problem that is currently anticipated is that of information sharing across organizational boundaries. Historically, I argue, a combination of management techniques, in combination with organizational structure and operations, have resulted in the fragmentation of work projects into individual tasks.

Using literature in organizations, management and alliance-building, I explore the organizational and managerial roots of the fragmentation of work and their subsequent effects on patterns of inter-agency information sharing, and suggest strategies to promote this goal. Key elements in the fragmentation of work appear to include scientific management practices and the increasing emphasis on bureaucratic expertise.

Inter-agency information sharing can be viewed as a sub-set of general alliance-building. Therefore, strategies to promote information sharing are similar to those used in the creation of inter-agency alliances for other purposes: appeals to professionalism, coercion and bargaining. In this paper, I develop a hypothesis to predict under what conditions each of these strategies will be employed.

CLIMATE AND PATTERN IN AFRICA'S PLANT SPECIES RICHNESS: BASED ON ANALYSES OF SOUTHERN AFRICA'S NATIVE WOODY FLORA by Eileen M. O'Brien, School of Geography, University of Oxford, Oxford, OX1 3TB, England.

The most well-documented and least understood biogeographic phenomena are the global patterns and trends in species richness. Geographic variations in climate afford a partial explanation.

The macro-scale distribution of species richness (species per 20,000 km^2) for southern Africa's woody flora (N=1372 species) describes a west-to-east pattern of increasing species richness, being lowest in arid to semi-arid areas (e.g. Kalahari) and highest in mesic to humid areas. Analysis of variance and regression describe the following general relationship:

$$\text{species richness} = (\text{Energy} - \text{Energy}^2) + \text{Moisture} \quad (R^2 = 77.8\%;\ P < .0001)$$

such that species richness is maximized when energy is optimized and moisture is maximized. When energy is greater or less than optimal or when moisture is reduced, species richness decreases.

The pattern of predicted (potential) species richness across Africa is in accord with the geographic variation in Africa's climate and vegetation. Predicted values of species richness are in reasonable accord with actual values for Mbala District, Zambia, 8°49'S and 32°12'E.

ASSESSING THE IMPACTS OF GLOBAL WARMING ON MEXICO by Karen L. O'Brien, University of Wisconsin, Madison, WI 53706

The global warming that is projected to occur over the next 50 years due to the greenhouse effect will not be spatially uniform. Some areas will experience greater climatic change than others, and the regional impacts of such change will vary. Mexico, a country with a generally arid climate and a rapidly increasing population, is particularly vulnerable to climatic change.

The potential impacts of global warming have important implications for agriculture, water resources and energy, as well as for socioeconomic policies. To assess the impacts of the greenhouse effect on Mexico, the results of five general circulation models have been analyzed. A methodology has been developed in order to determine possible regional climatic changes. GCM output has then been coupled with crop-yield models to assess potential impacts on Mexican agriculture. The results indicate that Mexico will become hotter and drier under conditions of increased greenhouse gases, and that Mexican agriculture could undergo substantial changes.

DESIGN ISSUES IN DEVELOPING A GIS FOR PEOPLE WITH SPECIAL NEEDS by L. G. O'Brien, SNIRU, Dept of Geography, University of Newcastle, UK.

People with special needs, for example, disabilities and handicaps, make up between 10% and 15% of the population of western countries. For the EC, this means about 35 million people --equivalent to the combined population of the five smallest EC countries. Very little is known about the lives of people with special needs, yet they are major consumers of welfare. As the population ages, there will be more, not fewer, people with special needs. Geography is perhaps the only social science which offers the level of integration necessary to understand the lives of these people, and the development of GIS offers a major way forward in meeting their needs and expectations. This paper looks at the design issues involved in building a special needs GIS for two areas in NE England. One is the urban area of Newcastle, the other, the largely rural area of County Durham. It will focus on issues of data quality and social measurement rather than GIS technicalities, but will attempt to locate the role of GIS in this all-important area of social research.

CONTINUITY AND CHANGE: THE MAKING OF THE COMMERCIAL STRIP by Anne V. O'Connor, University of Illinois, Urbana, Illinois, 61801

The American commercial strip is one of the most dynamic landscapes of the modern urban environment. It is continually changing and adapting to the needs of society, while acting as a place for experimentation with new products and new aesthetic forms. Today, historical eras of development are evident in remnant architectural types along the strip. Styles of architecture and their spatial arrangement can reveal changes in tastes and in values within American culture through these eras of successive development. In the initial stages of construction there was no precedent for architectural types on the strip. Later, a box-like form evolved called the 'shed' which became accepted as a suitable architectural style that could be easily redecorated as new design fads came and went. As such it became the most well used form of architecture along the changing commercial strip.

This study takes a look at historical and regional trends in shed decoration and the way in which these trends reflect changes in American culture. Such eras of American taste include the 'futurism' of the fifties and the 'environmentalism' of the seventies. As the shed is redecorated to attract the changing whims of the people, it has become a mirror of society; a reflection of the recent history of American culture.

LONGITUDINAL METHODS IN THE ANALYSIS OF SPATIAL PATTERNS by John Odland, Indiana University, Bloomington, Indiana 47405 and Mark Ellis, Florida State University, Tallahassee, Florida 32306

Methods for statistical analysis of sets of intervals, which have been developed primarily for the analysis of time intervals, can be employed to analyze locational patterns in a two-dimensional space. Longitudinal methods adapted for the two-dimensional case are used in this paper to examine a set of hypotheses about the spatial pattern of settlements in Nebraska.

The pattern of settlements is measured as a set of distances between neighboring towns and longitudinal methods are used to analyze the frequency distribution for these distances. Hypotheses about alternative density functions may be examined by fitting alternative hazard functions to these distances. Proportional hazards models are also employed to test hypotheses about covariation between the pattern of town locations and exogenous variables. Models for covariation between spatial patterns and exogenous variables will generally require the exogenous variables to be treated as locationally varying covariates, but the interpretation of survivor functions and hazard functions is less problematic in two-dimensions than in the parallel case of time-varying covariates.

TOURISM AND AGRICULTURE ON THE NORTH COAST OF THE DOMINICAN REPUBLIC by Andrea M. O'Ferrall, Michigan State University, East Lansing, Michigan 48824.

The growth of tourism has affected other sectors of the economy both supplying goods to the industry and competing for resources. This can be seen in three basic ways: 1) attraction of labor out of agriculture; 2) inflation of land values and land use changes; 3) creation of incentives for local producers to expand and diversify production. This study focuses on the role of agriculture as both a supplier of goods to tourism and in competition with tourism for the resources of land and labor.

It was expected that due to constraints such as unsuitable soils and climate and lack of knowledge or funds, local subsistence farmers would not be strongly affected by tourism demand. Instead, the relatively fixed supply of foodstuffs would be re-distributed, with hotels having the greater buying power. Land value and land use changes were studied in the municipality of Sosúa. There, land once zoned agricultural in sugar cane and cattle production has been zoned for tourism. Cattle farmers in the area are finding difficulty in hiring and keeping labor. Interviews with local workers indicate that tourism is not strongly attracting rural agricultural labor

SINKHOLE SEDIMENTS AND SOILS IN THE SOUTHWESTERN WISCONSIN KARST by Jongwoo Oh and Michael J. Day, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53201.

Karst in the Driftless Area of Southwestern Wisconsin exhibits a wide variety of depositional characteristics due to factors of topography, climate, parent material and human activity. In this study we compare the sediment properties of subsidence and collapse sinkholes. Sinkhole sediments might be expected to be different based on regional toposequences. Although much of the surface of theDriftless Area is mantled by loess, sediment in the Seneca sinkhole contains a high percentage of sand (34%) derived from upslope sandstone outcrops. Muscoda sinkhole, located on a ridge top, has a high percentage of silt (77%). Collapse sinkhole soils (John Gray, Star Valley and Pop's Cave sinkholes), on the other hand, have a high percentage of clay (24-32%). Sedimentary structure, texture, pH, organic content and color differ between the subsidence and collapse sinkholes.

The Changing Function of American Metropolitan Areas by Breandán Ó hUallacháin, Department of Geography, Arizona State University, Tempe, Arizona, 85287

Spatial associations among sectors of the economy describe the functions of metropolitan areas. In the U.S. metropolitan function has a significant influence on employment and income growth. Temporal changes in functions provide useful information on shifts in the urban system. The empirical results reported here are based on the factor analysis of employment shares in 78 sectors in the 150 largest metropolitan areas in 1977 and 1986. The sectors are mainly two-digit industries. Also included are nine auxiliary and administrative sectors and three government sectors. The government sectors are federal civilian employment, military employment, and state and local government employment.

The factor analyses succeed in identifying spatial associations among sectors and functional classes of metropolitan areas. A regression analysis reveals a strong association between metropolitan function and total employment and personal per capita income growth. The most noteworthy temporal change in spatial associations is the emergence by 1986 of business and professional services industrial complexes. These complexes have location patterns that are distinct from other high-order services. The results show little association between the location of corporate auxiliary and administrative activities and producer services.

THE GEOGRAPHY OF MAJOR LEAGUE BASEBALL PLAYER PRODUCTION: 1876-1989 by Carl F. Ojala and Michael T. Gadwood, Geography Department, Eastern Michigan University, Ypsilanti, Michigan 48197.

Major league baseball as we know it originated in 1876 with the founding of the National League. In 1900 the American League was formed. By 1902 separate league structures were established with 16 teams concentrated in 10 northeastern cities, a spatial organization that remained unchanged until 1953.

Since then, however, several teams have shifted locations, and 10 new franchises have been established. Twenty-six teams represent 22 urban areas today. All these new teams represent opportunity for more players to make it to the "big-time." But where do such players originate today? Where did they come from in earlier times? The purpose of this paper is to determine the source regions of major league baseball talent from 1876 to the present time.

For this analysis, the most recent issue of the Baseball Encyclopedia was used to determine the birthplaces of all major leaguers who have ever appeared in a big league game at any time in the history of the sport.

With 26 teams offering more playing opportunities, the geography of professional baseball player production is more representative of the national population distribution than ever before. It is obvious that baseball has evolved into a truly national game from the geographic standpoint. It is also evident that, in terms of sources of players, it has, in fact, evolved into an international game.

ROUTING PROBLEMS IN HUB NETWORKS, by M. E. O'Kelly and H.J. Miller, Department of Geography, The Ohio State University, Columbus, Ohio 43210.

Hub location models have, until now, been developed using a rather simple protocol for routing interactions between nodes. Since the modeler assumes that each node is directly connected to a single hub, and since the hubs are completely connected, all interactions have a unique path. As soon as additional connections are allowed and as soon as some direct interconnections between hubs are broken, the routing problem becomes much more interesting. This paper presents a notation and procedure for developing all shortest paths and routing information in generalized hub networks, while preserving some of the essential features of the hub and spoke topology. The key idea in this paper is to use Floyd's algorithm to obtain shortest paths, and to use special penalties to enforce routing through the hubs. Computational results are discussed for sample problems.

MIGRATION EXPECTATIONS AND ACTUAL BEHAVIOR by R. Oldakowski, University of Illinois, Urbana, Illinois, 61801.

This paper examines and compares the effectiveness of a model of migration expectations in explaining the migration expectations expressed by the respondents of two survey samples, one from Chicago, Illinois, the other from Springfield, Illinois. The model incorporates three sets of variables central to the migration decision making process: (1) socioeconomic and demographic characteristics, (2) ties to place of residence, and (3) ties to potential destinations. Discriminant analysis is utilized to test the model as survey respondents are classified as expected migrants or nonmigrants based on the above factors. Whereas the model is equally successful in explaining migration expectations within the two samples, interesting differences in the relative importance of individual variables arise.

The model is then utilized to explain the actual migration behavior of the Springfield survey respondents. Again, whereas the model is similarly effective in explaining migration expectations and migration behavior, the relative importance of individual variables differ. Furthermore, the model is more successful at explaining migration behavior than the migration expectations expressed by the respondents themselves.

COMPARATIVE PATTERNS OF SPECIES DIVERSITY IN MEDITERRANEAN-TYPE SHRUBLANDS AND HEATHLANDS by John F. O'Leary, Department of Geography, San Diego State University, San Diego, CA 92182-0381.

In this presentation I report upon species richness (alpha diversity) figures at two sampling scales for shrubland and heathland vegetation types that occur in mediterranean-climate areas of the world. A variety of historical and biogeographical events specific to each area have been invoked to account for intercontinental differences in richness. Others argue that ecological factors such as soil-nutrient status, disturbance regime, topographic diversity, and competition merit equal consideration as explanatory causes.

With the exception of closed shrubland (maquis) in Israel, California shrubland types are depauperate compared to their climatic analogues. I suggest that low richness in California shrublands has a largely historical and biogeographical explanation. The relatively recent expansion of chaparral, and especially, coastal sage scrub shrublands during the Quaternary appears largely attributable to: (1) the gradual development of a summer-dry climate, (2) increased fire frequency, and (3) orogenic activity creating additional favored habitats. While shrubland communities of Chile and the Old-World Mediterranean are also of recent development, they have experienced longer human disturbance and consequently display higher richness. Species-rich shrubland and heathland communities of South Africa and Australia are likely derived from more ancient communities.

I also briefly discuss the role of ecological factors in influencing diversity patterns within California shrublands, and the contribution of introduced species to mediterranean-type shrublands and heathlands.

CLIMATIC CLASSIFICATION: HISTORY, STATUS AND FUTURE by John E. Oliver, Department of Geography and Geology, Indiana State University, Terre Haute, IN 47803.

Following the arguments of logicians and taxonomists, classifications can considered as general or special purpose organizational systems. In contrast to the special purpose group, the general purpose systems generally transmit information although they may not offer any explanation about the areas classified.

Rudimentary groupings of climate originated in classical times and were enhanced by Arabic scholars of the 8-10th centuries. Formal classification has its roots in the 19th century when information about world areas became more readily available. Thereafter, the emphasis given to the purpose and procedure of classification differed; the varying approaches used by European and American climatologists are examined. When an inventory of systems is viewed, it becomes possible to provide a taxonomy of climate classification systems.

Of the many systems reviewed, those of Koppen and Thornthwaite appear to have had the greatest impact, with the former used to introduce world climatic distribution more frequently than either other empiric or available genetic systems.

The current trend in the use of classification points to a continuation of the general purpose systems for pedagogy, with special purpose, often genetic, systems being of most value in climatic research.

DEFINITION AND MEASUREMENT OF REGIONAL CONTEXTS IN INTERNATIONAL RELATIONS by J. O'Loughlin, University of Colorado, Boulder, CO. 80309-0260 and L. Anselin, University of California, Santa Barbara, CA. 93106.

The principal contribution of geography to the study of international relations is to develop a sense of place and context without sacrificing the study of system-wide conditioning of action-sequences. As a prologue to a spatial analysis of interstate relations for the global-system since 1948, the relative importance of geography, both in its locational (the regional setting of states or context) and interactional (the range and extent of state contacts) elements is evaluated. Additionally, the attributes of states in the world system are examined in both monadic (place-attribute matrix) and dyadic (place-place matrix) frameworks. Using the technique of spatial association, we identify and map the relevant contexts of international relations for all the states in the world-system since 1948 for the eleven types of interstate conflict and cooperation in the Conflict and Peace Data Bank (COPDAB). Selecting two summary measures, total conflict and total cooperation, the relative importance of context (regional location), country attributes and spatial dependence (interactive effects of neighboring states) is defined. The omission of the two geographic effects, context and spatial interaction, in the study of international relations is shown to lead to major problems in coefficient estimation and to inappropriate neglect of the place of the world's regions in the global cooperative-conflict system.

RELATIONSHIPS BETWEEN NDVI AND CLIMATE IN THE OREGON TRANSECT by J. Olsenholler, Department of Geography, University of Maryland, College Park, MD 20740

NOAA Supplied NDVI measurements are compared to climatic variables for seven stations in the Oregon Transect. Relationships between climate and vegetation response, as measured by the NDVI, are discussed, especially in relation to the time phase function between them.

POTENTIAL IMPACT OF GLOBAL WARMING ON TRANSPORTATION OF UNITED STATES AND CANADIAN GRAIN AND COAL EXPORTS by Howard E. Olson, Transportation Geographer, 6621 Wakefield Dr. No. 702, Alexandria, Virginia 22307.

The network of truck, rail, river, Great Lakes, and ocean transport as well as terminals and ports for exporting U.S. and Canadian grain and coal could receive severe shocks if present models of global warming are realized. The United States and Canada are major world exporters of both grain and coal.

Climate models depict significant warming and less soil moisture in all North American grain producing areas. Most severely affected would be the wheat farming areas of North Central U.S. and South Central Canada. Less grain produced and transported along with lower water conditions on navigable rivers and the Great Lakes would increase the cost of moving grain to export. Models show other grain producing areas of the Northern Hemisphere with significant warming and less soul moisture. Competing grain producing areas of the Southern Hemisphere are depicted as having more soil moisture and possibly more grain production. These factors combine to shift the origins and destinations of world grain movements. Coal production, consumption and transportation are highly sensitive to governmental policy actions to reduce carbon dioxide and other gases contributing to the greenhouse effect. Sea level rise would affect ocean terminals and ports. In conclusion, grain and coal export movements and potential climate changes are analyzed changes to ascertain likely subjects for geographical research.

GEOGRAPHIC AND SOCIAL SPACE IN 19TH CENTURY MONTREAL by S.H. Olson, McGill University, Montreal, H3A 2K6, and P.A. Thornton, Concordia University, Montreal, H3G 1M8.

A sample of families in Montreal, representative of the three principal ethnic groups: French Canadian, Irish Catholic, and Protestant, are reconstituted over the nineteenth century, using parish, census, directory and property tax evaluation data. Their residential patterns and moves are traced to explore the way families take root and move socially, geographically and economically in a rapidly extending urban habitat.

Distinct territorial distributions can be seen for the three cultural groups and for populations of contrasting social status. Ethnic distributions are not explained by the spatial arrangement of social classes. Individual households tend to locate according to both social dimensions: status and ethnicity. Some upward mobility can be discerned in all three communities, but this is not reflected in increasing homeownership. From the subset whose workplaces are known, we observe a trend toward separation of home and work. The advent of electric tramways in 1891 produces the expected increase of average distance between home and workplace. Despite the trend, many households retain a joint site for home and work: this subset includes a large share of shopkeepers, professionals and artisans.

The structure of households reveals a reliance on the labour of wives and other family members. The cycle of household liason and dissolution can be linked to economic independence, age and widowhood. Extended family groups create neighborhood networks, and the clan structure is reinforced by migration into the city from surrounding villages. Households of all socio-economic and cultural groups show greater than expected residential stability.

SPACE AND SOCIAL TRANSFORMATION IN NORTHERN NIGERIA by Susan E. Olson, University of California - Los Angeles, Los Angeles, CA 90024.

The purpose of this study is to identify some of the spatial effects stemming from colonial and post-colonial rule in northern Nigeria, and the resulting peripheralization of the area. Specifically, the study will explore the state apparatuses used to maintain the ruling class interests of the coastally-located power structure.

This work analyzes some of the shifts in state policies that have affected the region of northern Nigeria in the last 100 years, inhibiting and discouraging development and causing a lack of regional self-sufficiency. Focusing on the spatial systems that have been redefined as a result of colonial and post-colonial control, the study explores such factors of development as distribution of transportation and educational facilities within Nigeria and location of centers of control for various economic and political structures (e.g. banking, insurance, industry, military).

Northern Nigeria is a complicated region and its situation cannot be easily explained using models previously developed for discussion of the spatial processes involved in development. Dependency theory, core-periphery models or class analysis alone do not contain the elements that are needed in order to address the changes that have and are occurring in northern Nigeria. This study attempts to synthesize a more appropriate approach to answering some of the questions contained here.

MORPHOLOGY OF TRIBUTARY JUNCTIONS FORMED IN COHESIVE SEDIMENTS by Michael P. O'Neill, Department of Geography, Virginia Tech, Blacksburg, VA 24061.

The morphology of five tributary junctions formed in alluvium with high silt-clay content is examined. Although these channels flow through material rich in silt-clay, they transport relatively large quantities of sand and gravel. Discharge from these channels appears to be directly related to precipitation intensity; severe thunderstorms and local showers often yielding the highest discharges. The ratio of main channel discharge to tributary discharge at high flow (Q_1/Q_2) is shown to have little effect on the geometry of tributary junctions. However, the size and location of the zone of separation does appear to be related to the ratio Q_1/Q_2. During periods of low flow between storms, deposition of sand and gravel in the junction area significantly alters channel and flow characteristics. Stabilization of these deposits by vegetation may be a significant factor in the development and maintenance of channel junctions.

Results of the current investigation are compared with those from laboratory experiments of processes and forms at stream confluences. Although the basic form of natural stream junctions are duplicated in flume experiments, the nature of material in the channel perimeter appears to exert a control on junction morphology not considered in experimental models.

AN INVESTIGATION OF SPATIAL TERMS WITHIN A UNIVERSITY CAMPUS by T. R. Orf and P. F. Fisher, Department of Geography, Kent State University, Kent, Ohio 44242-0001

An experimental study of the geographic natural language concepts of 'near' and 'close' is presented. Using the Spatial Relations Acquisition Station, two groups of subjects were asked whether they believed particular buildings on the campus of Kent State University to be either near or close to one central building, the Student Center. Three clusters can be identified among the subjects responding for the concept near, and from the analysis of the close data directly parallel clusters can be identified. One cluster of each term shows all buildings to be near or close to the student center, while, at the other extreme, another shows all but a core group to be not-near. A number of personal characteristics were gathered for subjects in the study, but none gave significant prediction of which cluster a student might belong to.

BARRIER-BEACH GENESIS AND CHANGING WATER LEVELS: EVIDENCE FROM QUATERNARY LAKE SEDIMENTS by Amalie Jo Orme, California State University, Northridge, California 91330, and Antony R. Orme, University of California, Los Angeles, California 90024.

Various hypotheses formulated to explain the origin of barrier beaches may be condensed into four principal models: in-place accretion and emergence of longshore bars, partial submergence of coastal ridges, landward migration during marine transgressions, and spit extension by longshore drift. These models reflect the relative significance of vertical and lateral accretion, and of changing or stable water levels. Re-evaluation of barrier morphodynamics from sedimentary structures around Quaternary lakes in the western United States indicates that vertical accretion and overwash during rising lake levels most readily explain many beach barriers. The supporting evidence includes transgressive stratigraphy and limited longshore changes in structure and grain size. Longshore drift is primarily a modifying process, especially at the distal end of barriers breached by lagoon spillwaters. These views accord with many recent observations from ocean coasts where barrier beaches either migrated onshore or were submerged in-place during the Flandrian transgression, depending mainly on the nature and rate of sea-level rise. The observations also suggest that G.K.Gilbert was wrong to attribute barrier beaches around Lake Bonneville wholly to spit extension by longshore drift. Despite his own evidence for the effect of lake-level oscillations on barrier development, Gilbert was influenced by observable morphology rather than by mostly hidden sediments. Our study suggests that the morphostructural components of barrier beaches may reveal much about the nature of Quaternary lake-level oscillations, thus providing further insight on local and regional variations in water budgets.

AFTER THE FIRES: YELLOWSTONE VISITATION IN 1989 by Richard K. Ormrod and Richard G. Trahan, University of Northern Colorado, Greeley, Colorado 80639.

The large-scale fires that blazed out-of-control in Yellowstone National Park in late summer of 1988 were expected to impact the park's future visitation rates. Many forecasters expected a decline, created by images of blackened forests and destroyed ecosystems, others more optimistically looked for an increase, with visitors lured by expectations of a "new" Yellowstone.

Visitation in the summer of 1989, at record high levels, put to rest the scenario of decline, but left the question: were the fires responsible for this surge? Visitation levels at Yellowstone have been increasing since 1984. If that trend is projected, excluding the fire year of 1988, then the number of visits recorded in 1989 appears to be a simple continuation of the established trend, suggesting only that the fires did not discourage visitors.

However, if month-by-month trends are examined it can be seen that in May and June of 1988, before the fires began, visitation was below levels of the previous year. That is, growth was leveling off and perhaps beginning to decline. When the May-June trend is projected, including 1988, the levels reached in 1989 are clearly above "expected." This suggests that the fires, in fact, revitalized a sagging interest in visiting the park. Results from a random survey of households nationwide undertaken in the spring of 1989 support this conclusion. Respondents who had never or not-recently (past ten years) visited the park showed little change in their level of interest in visiting it. However, respondents who had visited the park recently reported a greatly increased interest in revisiting it to observe the effects of the fire. The net effect of these reported attitudes would be an increase in visitation beyond non-fire levels, with the excess composed of return visitors.

CROSS-SHORE SUSPENDED SEDIMENT TRANSPORT: THE ROLE OF WIND WAVES, INFRAGRAVITY WAVES AND MEAN FLOWS
Brian Greenwood, Departments of Geography and Geology and Phillip D. Osborne Department of Geography, Scarborough Campus, University of Toronto, Canada.

Prediction of sediment transport in the cross-shore direction under shoaling and breaking waves is poor while theory relating transport divergence to equilibrium slopes is even more rudimentary. This reflects a basic lack of understanding of the primary mechanics and hydrodynamics associated with sediment movement in this complex zone. A series of field experiments have being conducted to monitor in detail the wave and current fields and the associated sediment fluxes occurring in both lacustrine and marine environments, with varying grain sizes, nearshore slopes and wave climates. Sediment flux calculations are made using integration of the instantaneous cross-products of the velocity vector and suspended sediment concentration vector, as well as cross-products of time-averaged quantities. Anaysis of co-spectra of the velocity and concentration vectors reveal the contribution to transport of waves of different frequencies. It is clear from preliminary analysis that sediment transport is extremely episodic and that strong phase shifts ocurr in transport at different elevations above the bed. Association of suspended sediment transport with wind waves and low frequency waves (group bounded long waves) and bedforms at varying scales is critical. None of the present numerical or analytical models adequately reflect the importance of these phenomena.

"WOODFUEL AND DEFORESTATION" by W.Y. Osei, Department of Geography, Brandon University, Brandon, Manitoba.

Effective answers to the decline of forest ecosystems in many developing countries, will largely depend upon proper identification of the causes of forest loss specific to local site (regions etc.) conditions and considering the dynamics of time.

In this paper, an attempt is made to analyze in detail, the relationship between the use of wood for fuel (identified as a major cause of deforestation) and the loss of forest ecosystems, based on information collected at the basic level of woodfuel use, the farm village. It is indicated that: i. in most situations, fuel is identified as a potential source of forest loss where the wood resource base has previously been depleted by other more significant factors ii. deforestation resulting from fuel demands is primarily a function of vegetation type/status and, iii. recent technological innovations in the woodfuel sector pose more threats to standing forests, compared with increased fuel demands in the traditional sector of the spatio-economic system.

Agricultural Production Policy in Japan and Trade: The Soybean by Kenji K. Oshiro, Wright State University, Dayton, Ohio 45435.

The United States embargo of soybeans in 1973 and the tightening of global grain supplies in the early 1970's caused the Japanese to focus their attention on the adequacy and stability of their food supply. Processors and consumers were alarmed by the U.S. announcement of its soybean embargo. The Japanese government's response was to encourage more domestic production in selected crops such as soybeans as an element of agricultural production policy. To raise domestic production, programs were initiated to stimulate increases in soybean acreage by promoting the conversion of rice fields. However, even with monetary incentives to domestic producers, soybean production is expected to improve from only four percent in the 1980's to less than ten percent in the 1990's. Therefore, overseas sources of soybeans will continue to be the main suppliers to Japan. Thus, trade in soybeans must continue to be an important segment of Japanese agricultural commodity imports for the immediate future.

IMPACTS OF ENVIRONMENTAL PROTECTION ON REGIONAL RESTRUCTURING IN INDUSTRIALIZED SOCIETIES. A CASE STUDY OF HAMBURG METROPOLITAN AREA by Jürgen Oßenbrügge, Dept. of Geography, Univ. of Hamburg, Bundesstr. 55, 2000 Hamburg 13, Fed. Rep. of Germany

Environmental protection has become a new field of regulative policies in a period of deregulation in most western industrialized societies. The implementation of higher standards of air pollution control, waste water handling and other topics are changing the existing structure of production and are intensifying the quantitative importance of environmental industries. Especially old industrial regions with high unemployment rates, caused by recent overall trends of industrial restructuring, have become objects of discussion, wether environmental protection might become an instrument to counteract decreasing employment opportunities.

The paper analyzes reactions of local governments on the pressure of changing values in general and social movements in particular emphasizing public effects on decision making and possibilities for new forms of regulative policies on local level. The metropolitan area of Hamburg is an interesting example, because the city faced a difficult situation in the early eighties when unemployment and environmental problems chracterized an urban crisis. Regional strategies, designed to relieve the crisis phenomena and which have been elaborated by different political groups, will be analysed.

BRITISH AND IRA STRATEGY AND TACTICS IN NORTHERN IRELAND by P. O'Sullivan Florida State University, Tallahassee, Florida 32306-2050.

In revolutionary war or insurrection, the outcome has often depended on who best exploits the lie of the land. The relevant definition of terrain in this context includes not only the natural elements and artifacts but also the inhabitants and their sympathies. This is clearly true in the twenty year old conflict in Northern Ireland.

This paper explores the balance of political violence in the province in the light of a simple theory of revolutionary war. This theory posits appropriate strategies for rebels and the government with respect to the spatial deployment of power. Such a framework provides a clear, material point of departure from which to explore the doctrinal positions of the parties to the dispute on the one hand, and the specifics of tactics and terrain on the other. After posing the theory, we will consider the war between the British government and the IRA, moving from the geopolitical to the strategic to the tactical in increasing order of geographic scale.

HISTORIC BIOGEOGRAPHY OF THE NATIVE PIGEONS AND DOVES OF THE MARQUESAS ISLANDS by Dominique Pahlavan and David W. Steadman, New York State Museum, 3140 C.E.C., Albany, NY 12230.

The current assemblage of indigenous pigeons and doves in the Marquesas Islands consists of four species, all regarded as endemic to this somewhat isolated Eastern Polynesian archipelago. The distribution, species richness, and species diversity of Marquesan pigeons and doves have been increased through our study of bones from archaeological sites on the islands of Nuku Hiva, Ua Huka, Hiva Oa, and Tahuata. Ducula galeata, known only from Nuku Hiva, has been found on three other Marquesan islands and four islands outside of the Marquesas. Ptilinopus dupetitthouarsii still occurs on all four islands. Ptilinopus mercierii, known from Nuku Hiva and Hiva Oa, has been found on Ua Huka. Gallicolumba rubescens, confined today to Fatu Huku and Hatutu, has been found on Nuku Hiva, Ua Huka, Hiva Oa, and Tahuata. An extinct species, Gallicolumba nui, has been found on Ua Huka, Hiva Oa, Tahuata, and two islands outside of the Marquesas. Another extinct species, Macropygia heana, is known only from Ua Huka. These data demonstrate the inaccuracy of biogeographic analyses based only upon modern island avifaunas. The great amount of human impact necessitates an historical approach to studies of speciation, distributional patterns, and the relationships of species richness to island area, elevation, or isolation.

GEOGRAPHY OF TRADE UNION RESPONSES TO CHANGING UK LOCAL GOVERNMENT by J Painter, Open University, Milton Keynes, UK, MK7 6AA.

This paper aims to investigate how and why trade union responses to change in local government in the UK vary geographically.

Local government in the UK has undergone a massive restructuring during the past ten years. In particular, there are important tendencies towards the increased involvement of the private sector in the provision of local government services. These are the result of, among other things, the desire of the Conservative government to curb the power of both local government and the public sector trade unions.

The research describes the extent and causes of moves towards increased private sector involvement in local government service provision. It combines (i) an analysis of the responses by trade unions at the national level to these changes with (ii) a case study approach, based on in-depth interviews with trade unionists and others in selected places.

The paper concludes that change in local government in the UK, is both contested, and partly geographically constituted, and that this has implications both for the future of public sector trade unionism and for certain explanations of contemporary social change.

MID-TROPOSPHERIC TELECONNECTIONS AND SURFACE TEMPERATURE VARIABILITY IN THE NORTHERN HEMISPHERE by M. A. Palecki, Department of Geography, 415 Fronczak, State University of New York at Buffalo, Amherst, NY 14260.

Extratropical mid-tropospheric teleconnections are simultaneously occurring variations in pressure level height at two or more separate locations. In the last ten years, research has shown that these are not mere statistical artifacts, but reflect dynamic linkages within the climate system. These dynamic modes of variation occur in geographically preferred positions in the general circulation, having a substantial impact on the surface climates of these regions.

This paper examines teleconnection-surface air temperature relationships over the extratropics of the Northern Hemisphere. Teleconnections are identified by season using principal component analysis of 500 mb level height data. The component score time series are correlated with surface air temperatures to determine regional relationships. In some areas, regressions using several teleconnection indices show a high degree of explanatory power. Regression techniques are also used to examine the surface air temperature extremes occurring when teleconnections are strongest. These results carry implications for the spatial nature of air temperature change that could be expected from long term shifts in circulation patterns similar to the dynamic modes identified.

THE EFFECTS OF A MANDATED INSURANCE OFFER ON THE PROPENSITY TO PURCHASE EARTHQUAKE INSURANCE by Risa Palm and Michael Hodgson, Department of Geography, University of Colorado, Boulder, Colorado 80309.

Recent California legislation requires that insurance companies selling homeowners policies in California also offer to their subscribers the opportunity to purchase earthquake insurance. Additionally, there has been increased media attention to the earthquake hazard, possibly resulting in greater awareness of the risk by homeowners. The question addressed in this research is which homeowners, with what risk perceptions and located in which areas choose to purchase earthquake insurance. A survey of approximately 3700 owner-occupiers in Contra Costa, Santa Clara, Los Angeles and San Bernardino Counties was conducted in the spring of 1989, and responses concerning perceived risk were matched with the spatial distribution of actual risk, using a geographic information system. In general, a far higher percentage of California homeowners have earthquake insurance than was the case when Kunreuther and his colleagues conducted a baseline survey in 1973-74. In order to address the issue of "adverse selection" - that is, the tendency for people with the greatest objective risk to purchase insurance - households living in areas of greater seismic risk are compared with those living in areas of lower seismic risk.

CROSS-CULTURAL ASSESSMENT OF VISUAL IMPACT SIMULATIONS BY J. Palmer, SUNY College of Environmental Science & Forestry, Syracuse, New York 13210, Santiago Alonso, Madrid, Spain, Koh Dong-hee, Cheju City, Korea, Jacques Gury, Brest, France, Yesmin Hernandez, Santurce, Puerto Rico, Ryuzo Ohno, Kobe, Japan, Gilberto Oneto, Melano, Italy, Andrej Pogacnik, Ljubljana, Yugoslavia, and Richard Smardon, Syracuse, New York.

The past thirty years have seen increasing interest in managing environmental quality. These efforts have focused primarily on impacts to biological health and basic human needs. However, there is also some recognition that higher order needs provided by the environment must also be conserved and managed. As sophistication concerning the management of biological productivity and human welfare grows internationally, aesthetic quality will become a continuing issue that must be faced by land resource management agencies in all countries. Though the methods are well documented, there have been relatively few applied studies of aesthetic landscape perception outside of the United States.

This paper reports the findings of a study conducted by collaborators from eight countries. Its objectives are to: (1) Investigate the efficacy of using visual simulation among a culturally diverse group. (2) Investigate the influence of respondent attributes on scenic evaluations. (3) Investigate the influence of scene attributes on scenic evaluations. (4) Compare two methods of scenic evaluation for their efficacy in measuring visual impacts. (5) Investigate relations between environmental disposition and the evaluation of visual simulations.

The results demonstrate that the methods of scenic evaluation can be used effectively in other countries. However, differences among cultural groups can be expected. Scenic evaluations are also found to be affected by land form and land use characteristics of the scenes, and the respondent's environmental dispositions.

ROATÁN: AN EXAMPLE OF HISPANIZATION IN THE ENGLISH WESTERN CARIBBEAN by Jean Palmer-Moloney Colorado Mt. College, Breckenridge, Colorado 80424; Summit H.S., Frisco, CO. 80443

Up until the mid 1980s, the Bay Islands of Honduras were more British West Indian than Spanish American in appearance and in social/cultural traditions. Today, however, Hispanization of the Bay Islands is well under way. Using the main island of Roatán, this study investigates the causes and effects of the Hispanization process at work in the Bay Islands.

In a reversal of the typical internal colonialism model, the majority Hispanic population from the peripheral Honduran mainland is "invading" the core area established by the minority English-speaking population in the Bay Islands. The "Spanish", now the majority population of Roatán, continue to immigrate to the island from the mainland in search of better economic and political conditions. Roatán must provide for this growing landless unskilled population from its restricted resources and restricted economic opportunities. Resulting conflict and stress on the island have economic as well as ethnic causes.

The utility of the internal colonialism model is analyzed for the Bay Islands situation. Measures of relative ethnicity are proposed to delineate the island's population components.

THE DISPARITY BETWEEN GNP PER CAPITA AND THE QUALITY OF LIFE: A SPATIAL ANALYSIS USING THE EXPANSION METHOD by Steven R. Holloway, Department of Geography, University of Wisconsin, Madison, WI 53706, and Kavita Pandit, Department of Geography, University of Georgia, Athens, GA 30602.

The lack of correspondance between traditional economic measures of development such as GNP per capita and human welfare measures such as the physical quality of life index has been well documented in the literature. While considerable effort has gone into the specification of alternative measures as complements to or even replacements for the traditional ones, there has been less attention focused on the theoretical and empirical basis of the economic development-human welfare disparity itself. In this paper, a numerical indicator capturing the disparity between a country's GNP per capita and physical quality of life index is devised and described. Characteristics of the country's economic, demographic, and political structure are found to influence the disparity indicator. Expansion techniques reveal that there is a regional variation in the impact of the various structural determinants on the income-welfare disparity.

EVALUATING EFFICIENCY OF LARGE CHINESE CITIES by Clifton W. Pannell, University of Georgia, Athens, GA 30602.

Urban theory indicates large cities are the centers of the greatest efficiency in industrial production as a result of scale and agglomeration economies. In China under socialism the evidence has been ambiguous, and some studies have shown little or no relationship between productivity of industrial workers and size of city where cities of all sizes were examined, a presumed consequence of the lack of labor and capital mobility under socialism.

Analysis of 1985 data on China's 29 largest cities (all > 1 million city population) indicated a clear relationship between city size and economic efficiency of industrial enterprises based on the profits of these enterprises per amount of original value of fixed assets.

Collective enterprises showed a stronger response (Pearson's r of .71) compared with state owned enterprises (Pearson's r of .63), both using non-agricultural populations of large cities as the independent variable. These results suggest that economic reforms initiated in the 1980s are taking effect in the largest cities. Analysis of residuals indicated considerable variation in efficiency possibly related to features such as location and historical role and economic activities of certain cities.

CONCEPTUAL FOUNDATIONS OF SPATIAL CHOICE MODELS by G. Leonardi and Y.Y. Papageorgiou, McMaster University, Hamilton, Ontario, L8S 4K1.

Location choice affects the feasible consumption set of an individual through the associated money and time costs of transportation. Taking this into account, we can partition the choice procedures adopted by and individual in two stages. Firstly, the individual determines the optimal consumption bundle for each of the distinct feasible consumption sets that correspond to each of the locations considered. Secondly, he compares the resulting optimal utility levels and he chooses a location for which the optimal utility level is a maximum in the spatial choice set. A search for optimal consumption bundles is undertaken through sampling of the feasible consumption sets involved. Since sampling is costless, the sample can be arbitrarily large and we may use the asymptotic theory of extremes in order to determine the probability that the consumption bundle associated with the highest overall utility level will correspond to any particular location. Different sample designs generate different location probability classes. Of those, we discuss models generated by a perfectly even distribution of the sample over the consumption choice sets, as well as models generated by a sampling design which takes into account the distribution of population over the land. The former corresponds to the multinomial logit model when the spatial choice set is discrete. In general, discrete spatial choice models can be generalized for continuous space, and their location choice utility is given by the expected maximum utility to be attained at the location considered.

Retail Trends in Illinois Counties 1935-1985 by Siyoung Park, Western Illinois University, Macomb, IL 61455.

Retail sales and marketing activities have always been the key economic activities associated with urban centers. The purpose of this study is to compare the market share of the metropolitan and nonmetro areas of Illinois for the last 50 years to determine if relative market share shifted from Chicago to downstate. Rand McNally Commercial Atlas & Marketing Guides from 1935 to 1985 as well as the Census of Retail Trade for 1972, 1977, 1982 were used for the analysis. The dominance of Cook County was the highest in 1935 with 63 percent of total Illinois retail sales, and it continuously declined down 44 percent in 1985. The loss of retail share was in general merchandise and food items, yet Cook County still maintained its prominence in apparel with 59 percent of the state's share in 1985. Chicago suburban counties and other Illinois metropolitan counties have gained market share while nonmetropolitan counties remained the same during the study period. Changes in the number of retail establishments, retail employment, and the volume of sales in Illinois metropolitan areas clearly demonstrate the suburbanization of retail businesses.

ETHNOAGRICULTURE IN EASTERN NEPAL: PATTERNS AND PROCESSES by Anne Zonne Parker, Department of Geography, University of Oregon, Eugene OR 97403.

The patterns and processes occurring in indigenous agricultural systems as they face change and development will be discussed, with particular attention paid to an ethnically diverse area of Eastern Nepal. An analysis will be presented of the perceptions of land and land use by the different ethnic groups and their interaction with each other, which provides models for the cultural processes occurring within Nepal.

NOMAD: TACTILE-AUDIO SPATIAL INFORMATION ACQUISITION FOR THE VISUALLY IMPAIRED, by Don Parkes, Institute of Behavioural Sciences, University of Newcastle, Australia 2308.

If you know where something is, it is much easier to reach it! This axiom holds true whether one is reaching for a book on a shelf or making plans to reach a particular place for a meeting. NOMAD is a tactile-audio device for extending the reach of blind and visually impaired people by providing a facility for the acquisition and management of spatial information. A number of vector based calculations are also possible, including compass and egocentric directions, straight line and irregular path distances and areas. There are also facilities for the emulation of colour and pattern by a sound frequency palette for painting points, lines, curves and areas with sound. A ten minute video will demonstrate the operation of some of NOMAD's spatial information acquisition and management facilities.

A REVIEW OF METHODS FOR MEASURING PUBLIC TRANSPORTATION NEEDS BY Bruno P. Parolin, University of New South Wales, Kensington, New South Wales, Australia, 2033.

The paper aims to review methods for measuring public transportation needs which have been developed in both rural and urban contexts in the UK, USA, and Australia. Specifically, the purpose is to evaluate and assess the various methods in terms of their effectiveness for needs based transport planning.

The review looks at seven measures of transport need developed in the UK, four in the USA and one in Australia. Differences and similarities in the components of these transport needs indicators are highlighted with reference to the travel needs concept. Assessment and evaluation is based on consistency with the travel needs concept, specified variable selection criteria, consistency of results produced by the indices, and availability of follow up studies on the effectiveness of allocations based on index assessments.

Several conclusions are reached. First, the diversity of measures developed reflects wider differences in the interpretation of the travel needs concept. Second, definitions of travel need and hence the components of indices reflect high levels of subjectivity. Third, inconsistency of results produced by the measures can affect the allocation and distribution of resources. Finally, the unavailability of follow-up studies on the effectiveness of allocations based on travel need index assessments hinders the application of such methods. Some suggestions are then made for alternative methods of travel needs measurement for needs based transport planning.

THEORETICAL AND METHODOLOGICAL ISSUES IN BULGARIAN REGIONAL POLICY by K. Paskaleva, Institute of Geography, Bulgarian Academy of Sciences, Sofia, Bulgaria

This paper discusses recent Bulgarian regional policy. It examines the basic theoretical and methodological issues in the socio-economic development of "territorial communities," namely, regions, communes, and municipalities. It also considers the characteristics and principles behind their formation and development, the role of the "territorial factor," and regional economic policy. Municipalities are not considered important in this regional approach. As self-governing communities of the population, the communes are the basic unit of territorial management of the country. The regions are considered communities incorporating the population of communes and charged with specific functions referring to the working out of strategic guidelines in the development of regional economics and the construction of infrastructure catering to the needs of the regions. Each of the nine regions has been delineated from a socio-economic point of view, indicating its specific niche in the economic complex of the country.

Abstract of:
A Comparison of Wayfinding Abilities of Blind and Sighted Populations
a paper for the annual meeting of the AAG in Toronto, 1990
by Romedi Passini, University of Montreal

The paper presents three studies on wayfinding and the underlying spatio-cognitive abilities of visually impaired and sighted people. In a first experiment a group of 15 congenitally totally blind subjects and a matched control group of 15 sighted subjects were guided through a complex architectural setting. The tasks were to describe the journey in as much detail as possible, then to make the journey on their own and to reproduce the route. An analysis of decision making showed that the blind subjects tended to prepare their journey in more detail, that they made significantly more decisions during the journey in more detail, that they made more units of information. The cognitive mapping exercise demonstrated some blind subjects' ability to represent the route without errors; the performance of the sighted group was only slightly superior.

The second experiment was to test the spatio-cognitive abilities of the visually impaired. The tests which were executed in a labyrinthal layout, consisted of eight basic wayfinding tasks each representing a particular spatio-cognitive operation. The sample comprised congenitally totally blind, adventitiously totally blind and subjects with a weak visual residue. The control was established by a sighted and a sighted blindfolded group., Each group had 18 subjects. The performance results of the visually impaired groups, in all eight tasks, led to the rejection of any spatio-cognitive deficiency theory. The performance of the congenitally totally blind group in particular, showed that spatio-cognitive skills can be acquired without vision and without previous visual experience.

In a third experiment, visually impaired and sighted subjects had to perform wayfinding tasks in a labyrinth under two conditions: with and without environmental cues. The cues were selected to represent sensory modalities and they were controlled in terms of quantity and intensity. The objectives were to show that wayfinding performance and spatial representation improves when environmental cues are present and to identify the type of cues most useful for the different groups of visually impaired and sighted subjects. The study is in process and results will be available by April 1990.

THE RELATION BETWEEN LAND COVER TYPE AND FUZZY MEMBERSHIP OF LAND COVER CLASSES DERIVED FROM LANDSAT IMAGERY by S.Pathirana and P.F.Fisher, Kent State University, Kent, Ohio 44242-0001.

One of the standard products derived from satellite data is the land cover map. It is claimed that such maps show the land cover type occurring at each pixel. This assumption reflects merely the final decision rule in the classification process, and not the full course of many analyses. It also makes the often unstated assumption of pixel purity, which even in imagery taken by high resolution sensors is not met in many terrains. In the research reported here, the investigators have been examining the fuzzy membership of pixels in all land cover classes. The work demonstrates a strong positive correlation between the fuzzy membership values of land cover types and the proportion of the pixels occupied by the the cover type. The fuzzy membership is thus taken to be a measure of the area of a pixel occupied by each land cover type. This conclusion has considerable implications, which include land cover area estimation, storage volume requirements for image processing, and map generalization.

THE PALESTINIAN INTIFADA: A GEOGRAPHICAL ANALYSIS by John G. Patterson, University of Wisconsin-Whitewater, Whitewater, WI 53190.

The Arab-Israeli conflict has haunted the Middle East the last four decades. The Palestinian uprising, commonly called the intifada, is reducing the conflict to one of its essential elements, the Palestinians' quest for their own state. The Palestine Liberation Organization and Palestine National Council have recognized Israel's right to exist and accepted the West Bank and Gaza as the territories for such a state. This paper assesses the first two years of the intifada, with particular emphasis on the geographic nature and scope of the uprising in the West Bank and Gaza and, to a lesser degree, within Israel. Palestinian deaths are given special attention but other aspects of the uprising and Israel's response to them, such as detentions, house demolitions, deportations and village sieges, are also considered. Although core areas of the uprising are revealed, a notable feature of the intifada has been the geographic dispersal throughout the occupied territories of what has evolved into a liberation movement. Resolving the conflict along the lines envisioned by United Nations Resolution 242 calls for a political geography solution to the fundamental geographic problem of two peoples, the Jews and Palestinians, claiming rights to the same land. In light of internal dissension and a relatively weak coalition government in Israel, the United States needs to play a pivotal role in reaching a solution.

INTERPRETIVE COMMUNITIES IN SANTA MONICA: ORGANIZING THE PEOPLE'S REPUBLIC Alan Paul, Dept. of Geography, UCLA

The city of Santa Monica has one of the nation's most progressive local governments, known for its tenant protection laws and high level of citizen participation in local politics. Until the 1970s, however, the city was controlled instrumentally by a coalition of realty, business, and wealthy homeowner interests. This paper describes the grassroots origins of the neighborhood organizations which overthrew the conservative majority.

The tenant activists who were eventually elected to control of the city were turned away in their first two attempts. Their victory came only after an intensive organizing effort built on the otherwise microscopic issue of parking. By "creating" an output crisis in the provision of local services, the activist coalition got experience in political rhetoric and manipulation which it used to become a major interpretive community on the local scene.

This paper suggests that the territorial nature of the problem allowed the organizers to overcome the problem of multiple group membership which would have otherwise diluted their power. By rephrasing citizens' complaints about womens' safety and outsiders' use of resources into a language more appropriate to the traffic engineers who controlled parking, they were able to inject politics into an otherwise technical bureacracy. This skill in the manipulation of language to control the state apparatus was later put to use successfully in the battles for rent control and in the electoral fight for city hall.

"WOMEN IN DEVELOPMENT:" A TAXONOMIC ANALYSIS by Bimal Kanti Paul, Old Dominion University, Norfolk, Virginia 23529.

Using seven basic indicators of the condition of women in society, this paper ranks the countries of the world. The indicators, which reflect the demographic status of the women and their access to selected health and education services, are drawn from the World Development Report of the World Bank. The Wroclaw Method is applied to rank the countries of the world. For a particular set of indicators, the method computes a "composite" score for each country and thus greatly facilitates international comparison. The countries are then grouped into four classes based on their composite score which ranges between 0.0 (for the most developed country) and 1.0 (for the least developed country). The groupings produce a robust, versatile measure that provides multidimensional insights about variations in women's overall status in the contemporary world. The patterns obtained closely correspond with the level of economic development of each country.

TRANSBORDER OUTSHOPPING OF MAQUILA EMPLOYEES: IMPACTS ON ARIZONA'S BORDER COMMUNITIES by Vera K. Pavlakovic, The University of Arizona, Tucson, AZ 85721.

From its beginnings in mid-1960s, Mexico's maquila industry raised expectations about positive economic impacts on American border communities. It has been generally argued that a considerable portion of wages and salaries paid to the maquila employees in Mexico returns directly to the U.S. economy through transborder outshopping for American goods and services.

The purpose of this study is to investigate regional and sectoral impacts of transborder outshopping of maquiladora employees on the economy of Arizona. The very nature of international reorganization of production, of which the maquila industry is a part, determines the predominance of low-wage labor force; about 90 percent of maquiladora employees are in minimum wage category, although additional cash and other benefits are paid as companies cope with high turnover and labor shortages.

Series of peso devaluations, introduced by Mexico's government since the mid-1970s, have constantly discouraged transborder outshopping of Mexican nationals. Consequently, pronounced adjustments occurred in both volume and type of expenditures. Continuing growth of industry and the increase in the number of employees partly offsets the impacts of decrease in individual buying power.

Total impacts of transborder outshopping largely depend upon the specific regional structure. Arizona's border communities are less diversified and more sensitive to developments south of the border.

Empirical evidence for the evaluation of regional and sectoral impacts was collected through a survey of employees in maquiladoras in northern Sonora.

INTERNATIONAL INVESTMENT AND SECTORAL SHIFTS OF THREE GERMAN STEEL CORPORATIONS by Claire E. Pavlik. Department of Geography, University of Minnesota, Minneapolis, Minnesota 55455.

Postwar economic development of western industrial nations is characterized by two broad trends. The national economies have shifted, in terms of proportion of GNP as well as of the proportion of the labor force employed, from the primary and secondary sectors, such as agriculture, mining and heavy industry, to the tertiary and quaternary sectors, such as consumer and financial services. In addition to this shift in the composition of the national economy both trade and foreign investment have expanded.

While the national shift away from primary and secondary economic activities has been studied, the reaction of corporations to industrial decline, in terms of locational and production decisions combined, has scarcely been examined. The case study approach is used in this paper to examine both sectoral shifts within and foreign investment of three West German steel corporations from 1945 to 1985. The analysis of the evolution of the Thyssen, Mannesmann and Hoesch corporations is placed within the context ofthe international economy and European Community, as well as within the frame of the West German economic policies.

EFFECTS OF EXTREME CLIMATIC CONDITIONS ON TRACE METAL TRANSPORT IN DEVELOPED BASINS by Robert T. Pavlowsky, Dept. of Geography, Univ. of Wisconsin-Madison, Madison, Wisconsin 53706, and William H. Renwick, Dept. of Geography, Univ. of Miami-Ohio, Oxford, Ohio 45056.

One application of the magnitude/frequency concept in fluvial geomorphology is the use of flow duration-rating curves for deriving nonpoint pollution load estimates so as to link human impacts to water quality conditions. In this study, the effects of extreme climatic conditions on trace metal (Co,Cr,Cu,Ni,Pb,Zn) yields are described in the developed Raritan Basin (2253 km^2) in central New Jersey. Metal yields produced during a relatively intense hurricane-associated storm (30 year return frequency) that followed a 20-50 year drought period were 10 to 1000 times greater than yields produced during a "normal" 2.5 year storm. Peak and total runoff were similar for both storms. Mass-balance calculations suggest that the higher yields were produced by the release of metals from temporary storages on the basin surface. Further, most of the additional metal load was in the "bioavailable" dissolved phase, and effects were most noticeable in basins and for metals most closely related to anthropogenic factors. Results of this study indicate that the effects of long period, large-scale climatic patterns on pollutant mobilization and transport should be considered when developing nonpoint transport models. In this manner, the links between pollution sources and their effects on downstream water quality could be more effectively resolved.

Resource Use and Environmental Policy: Oregon Initiatives for the Nineties by James R. Pease, Oregon State University, Corvallis, OR 97331-5505

In Oregon, as elsewhere, mounting concern over loss of valuable resource lands and special environments have led to recent policy initiatives on a broad front of resource issues. Many of these initiatives are targeted specifically to natural resource producers. New state policies and regulations restrict land use options and the impacts of resource activities on farmlands, forestlands, wetlands, riparian zones, wildlife habitat, river corridors, waterbodies, and groundwater. Although often regulated by legislation, some coordination of policies are achieved through the state's land use planning system. Local plans and ordinances must address wetlands, for example, while specific enforcement authorities are vested in the state forestry department and the division of state lands. River corridors are protected under both the federal wild and rivers act and the state scenic waterways programs. Cities and counties must address the federal and state policies for a protection of the river corridors through the updating process for their land use plans and ordinances. Policies for the protection of resource lands and special environments have particular significance for rural landowners and resource users, since the range of alternative uses and activities are limited by these policies. This paper examines the various initiatives, traces the regulatory pathways for policy implementation, and assesses potential effects of the policies on resource producers.

BORDERLINE AND BORDERLAND: A PERSPECTIVE ON GEOGRAPHIC RESEARCH IN THE U.S.-MEXICO BOUNDARY ZONE by Leland R. Pederson, The University of Arizona, Tucson, AZ 85721.

The international boundary that was defined in the zone of friction between the northward-moving frontier of Mexico and the westward-moving frontier of the United States remains today a sharp division between highly dissimilar cultures and economies, even though social and economic interaction across that border has expanded substantially and the line itself has become increasingly attractive to human settlement and activity. During the past couple of decades geographers have continued to study the borderlands of both countries, but with scholars in several other disciplines they have also directed greater attention to the border as border and to the realities directly associated with it. The emerging body of border literature seems to recognize that the United States-Mexico borderline is the axis of a poorly defined and perhaps indefinable border zone with its own dynamic, with attributes and activities partially and variably distinct from those marking the greater borderlands of the American Southwest and the Mexican North, which the borderline both separates and joins. Ambiguity and asymmetry rather than precision and symmetry characterize this border zone and the transboundary transactions that occur within it.

POLITICAL ECONOMY AND HUMAN GEOGRAPHY by Richard Peet and Nigel Thrift, Clark University, Worcester, MA 01610 and University of Bristol, Bristol, England.

In the last twenty years human geography has been transformed in content and intellectual quality. Previously unmentionable names like Marx, and scarcely mentioned topics like underdevelopment have become commonplace. The political economy movement is a prime mover in the formulation of geography's new models, theories and philosophies. We trace the main currents of political economic geography from radical geography, through "structural Marxism," to structuration theory, realism and postmodernism, briefly outlining the main stance of each position. We present criticisms of each, and some of the replies to these criticisms. We speculate on the future course of political economic geography. And finally we outline the New Models in Geography sessions taking place at this meeting of the Association.

IMPACTS OF FLUCTUATING WATER LEVELS OF THE GREAT LAKES ON TRANSPORTATION by M. Pelone, Corps of Engineers; T. Muir, Environment Canada; J. Greenwood, Freshwater Press, Inc.

A qualitative overview of Great Lakes waterborne commerce sector was prepared. An extensive field interview process was used to allow maximum input by each component of the transportation network. Shipyards, fleet operators, port authorities, railroads and major shippers and receivers share a concern for extreme water level conditions. The importance of fluctuating water levels in light of other business variables was identified. The U.S. and Canadian Great Lakes fleet consists of about 200 ships which may be subject to less than full utilization during periods of extremely low water levels. Extreme high water conditions are not disruptive to ship operations, but may create problems at loading and unloading docks, especially during storm events. Some firms are sensitized from the recent high water level of 1987-1988 and have developed new rate structures to allow risk sharing among various elements of the transportation system. A do-nothing alternative and continuation of the status quo was preferred by many firms. Dredging actions by private firms and the public sector were considered by many to be responsive and site-specific. Further investigation of this option will be considered in the next stage of study.

ETHNICITY: THEORETICAL CONCEPTIONS AND EMPIRICAL PERCEPTIONS by Jan Penrose, Department of Geography, University College London, 26 Bedford Way, London, England.

In general, geographical work which deals with the future of the global village tends to focus on environmental and economic concerns. This paper builds on the assumption that the cultural aspects of world-wide integration and cooperation also warrant significant attention. To enhance our understanding of the role that cultural or ethnic groups play in shaping the global community this paper explores theoretical attempts to define ethnicity and, then, compares these with personal expressions of ethnicity. The central theoretical constructs to be discussed are the rational-nonrational and objective-subjective dichotomies that have emerged from academic discourse on the nature of ethnicity. Personal expressions of ethnicity are derived from survey research among the Frisians, who currently form an ethnic minority in the Netherlands. The comparison of theoretical conceptions of ethnicity with personal perceptions of the same phenomenon demonstrates that the value of analytic constructs in organizing thought is not always balanced by practical application. An understanding of ethnicity, and of its role in the contemporary world, can be greatly enhanced by consulting with and listening to those who experience ethnicity as a basis for self-identification and as an integral part of daily life.

THE TVA RURAL LAND CLASSIFICATION SYSTEM AND GIS--WHAT IF! by R.W. Peplies, East Tennessee State University and D. Keil, City of Johnson City, Johnson City, Tennessee 37601.

The purpose of this paper is to present an analysis/benefits of a traditional approach to land use classification in light of Geographical Information System (GIS). The Tennessee Valley Authority (TVA) land use classification evolved from the fractional code system, originally conceived as the Monfort study. The fractional code procedure was to provide a means to map relationships between physical and cultural phenomena.

The function of the TVA Rural Land Classification was to "fill the gap between detailed field and general reconnaissance". And accordingly, full use of the former was to provide absolute, quantitative data, accurate and complete in terms of areal coverage. In contrast, the latter was to provide relative areal data related to the rural resources of the Valley. Only two-thirds of the Valley was mapped. None of these data were ever used by TVA management to make decisions regarding land use.

The failure of the TVA Rural Land Classification was a result of a number of factors, not least important were the political ones. Others included the lack of a complete product after an extended period of time.

The scenario presented here is that the TVA Rural Land Classification program might have been successful if GIS were available. Then again it might not have been.

TALUS SHIFT NEAR ROCK OUTCROPS IN THE CALIFORNIA CASCADES by F. L. Pérez, Dept. of Geography, University of Texas, Austin Texas 78712

Rates of superficial clast movement were measured for a period of up to 7 years at 9 different locations on Lassen Peak (Lassen Volcanic National Park, California) between 2800 and 2950 m altitude. About 400 clasts were painted and placed on the talus surface along lines extending parallel to slope contours and away from massive outcrops of the volcanic dacite plug. Talus texture and average particle size were obtained by photographic methods; plant species presence, density, and distribution were sampled on the talus and on the rock outcrops.

Clasts located downslope from rock outcrops moved the least (about 5 cm/year), while painted stones placed at the outcrop margins were displaced at rates of 23 to 45 cm/year. This occurs because rock outcrops obstruct the free movement of descending superficial debris, which are dammed upslope and then deflected laterally towards the outcrop edges. Rates of movement on the open talus (average = 15 cm/year) were inversely correlated with vegetation cover and average particle size, and were highest on finely grained surfaces. Several processes, including rockfall, dry debris slides, miniature debris flows, runoff, and needle ice disturbance effected marker shift.

REDLINING REEXAMINED by Eugene D. Perle, Department of Geography and Urban Planning, Wayne State University, Detroit, Michigan 48202.

In the euphoria of social agendas during the 1970's it was common to ascribe much of the residential disinvestment in American cities to redlining. Wherever and whenever differential lending rates were found the conclusion was automatic and emphatic–redlining was the cause. In spite of the fact that the data were sparse and poor the conclusions were always an indictment of lending institutions.

Several good studies have recently appeared regarding redlining, where the effort is directed at trying to ascertain the existence of systematic lending behavior based upon a good data set. These studies seem to indicate that widespread systematic bias in lending behavior, attributable to race, is either hard to find or non-existent. The recent appearance of these studies is completely dependent upon the availability of new data which provide the opportunity now to explore the redlining phenomenon in much greater detail than before.

In Michigan all lending institutions are required by law, as of 1977, to submit annual reports to the Financial Institutions Bureau, an agency of state government. Therefore, good mortgage lending data is now available for the City of Detroit by census tract starting in 1980. When we merge mortgage lending data together with conventional census tract characteristics of the residential population the existence of definitive redlining behavior becomes clouded, indeed. Observable lending behavior practices often seem attributable to other sources of variation rather than race. Perhaps our earlier indictment of the financial community was premature?

AFRICAN RIVER BASIN DEVELOPMENT: ACHIEVEMENTS, THE ROLE OF INSTITUTIONS, AND STRATEGIES FOR THE FUTURE by Richard W. Perritt, Department of Geography, Auburn University, Auburn, Alabama 36849.

An assessment of Africa's general record indicates that river basin development schemes were important to the future well-being of the continent, but the anticipated results relating to projected goals and benefits on an integrated and multiple purpose basis had not materialized to affect positively the lives of large numbers of people in African countries.

The general conclusion was that river basin development, in terms of projects and programmes favouring change, had not accomplished their potential as a tool for comprehensive development at the national and regional scale and had least affected local level development.

RESIDENTIAL LOCATION OF URBAN INDIANS, REGINA AND SASKATOON by Evelyn J. Peters, Department of Geography, Queen's University, Kingston, Ontario, K7L 3N6.

In a number of case studies researchers have commented on the absence of urban Indian neighborhoods and have contrasted Indian settltment patterns with those found in other urban ethnic groups. In contrast to the impression given by case studies, segregation indices from the 1981 Canadian Census indicate that in many metropolitan areas Indian households show a considerable degree of residential segregation. These results raise questions about the degree of segregation within census tracts, and the intensity of social contact among households located near each other.

This paper will employ addresses of individual Indian households in Regina and Saskatoon to study various facets of their residential location. Information about socio-economic status, reserve origin and length of urban residence are also available. While these data cannot directly demonstrate ties between households, they can indicate whether Indian households are clustered or dispersed within census tracts, whether clustering is related to the location of low-cost housing, and whether individuals from the same reserves tend to find housing near each other. Answers to these questions could suggest whether "absence of neighborhoods" means absence of neighboring, or absence of clustering. Finally, length of residence data may show changes in residential location with increasing time in, and familiarity with, the city, and further the interpretation of settlement patterns or urban Indians.

WEATHERING DEPRESSIONS ON A 19TH CENTURY GRAVE STONE: VALID INDICATORS FOR RATES OF GRANITIC DECOMPOSITION? James Petersen, Southwest Texas State University, San Marcos, Texas 78666.

In a Fredericksburg, Texas cemetery, a rough-finished horizontal slab of locally-quarried granite is marred by a pair of weathering pans about 0.25 m by 0.30 m in diameter. The slab is a part of a grave monument that is dated 1887. These pans are surprisingly large in depth and size, given the horizontal tombstone's recent date. Granite weathering depressions usually offer little age evidence to support a derivation of decomposition rates. Datable rock surfaces, such as this example, can yield important data on rates of rock weathering. In the geomorphological literature, estimates based on studies of datable rock surfaces suggest that weathering can produce pits on granite blocks within a few thousand years. Development of pits as large as those found in this central Texas example, within the hundred year age of the tombstone, would require weathering rates considerably greater than previously reported estimates. Strategies will be discussed for assessing the validity of this potential evidence for rates of weathering. An important consideration will be whether the tombstone date indicates the age of the weathering pans, or if these depressions already existed on the rock surface when the slab was placed on the site in 1887.

A MICROCOMPUTER-BASED APPROACH TO LAND-USE PLANNING AND MAP ANALYSIS INSTRUCTION, by Gary G. Peterson, University of Arizona, Tucson, Arizona 85721.

Classroom instruction in land-use planning, map analysis and spatial statistics is greatly enhanced through use of a microcomputer-based geographic information system (GIS). A newly- developed GIS package supporting both IBM-compatible and Apple Macintosh microcomputers is presented and applied to various map analysis and planning-related problems. The package, developed using a popular electronic spreadsheet program, draws on parallels between the cellular spreadsheet structure and a grid-based GIS. The program is fully automated and offers a convenient, yet flexible vehicle for providing a "hands-on" instruction. The computer-assisted approach is demonstrated using instruction modules in spatial autocorrelation, public facilities siting and viewshed analysis.

* * *

Mac CHORO II by Michael Peterson, Image Mapping System, P.O. Box 31593, Omaha NE 68131.

MacChoro II is a choropleth mapping and map animation program for the Apple MacIntosh computer. The program is intended as a tool for spatial data analysis. Its purpose is to accurately display the character of a distribution and relationships between separate distributions. The program incorporates four methods of data-classification, plus the unclassed and user-defined class-breaks methods. A classification accuracy index is used to evaluate how well each classification is representing the data. Normally maps are updated in about 5-10 seconds. However, a series of maps can be put into animation and displayed at user-defined speeds of up to 60 frames per second. These animations can consist of different classifications of a single variable and/or a single classification of multiple variables. The animation feature can be used to examine both the effects of data classification and change in the distribution of a variable over time. The animations can also be saved to disk and played back later. The program requires a MacIntosh with at least 1mb of memory and two 800k disk-drives.

A CROSS-CULTURAL PERSPECTIVE OF RECREATIONAL USE ON THE URBAN NATIONAL FOREST AND THE AMERICAN LAND ETHIC

by Robert E. Pfister, California State Polytechnic University-Pomona, Pomona, CA 91768 and David E. Simcox, California State University-Chico, CA 95926

The urban national forests have substantial resource management challenges that relate to the size and composition of the urban population adjacent to its boundaries. The Angeles National Forest borders on a metropolitan area of over ten million culturally diverse residents and some 31 million visitors engaged in recreational activities on the forest in 1989.

The cross-cultural research for 1989 sought to test three data collections methods and monetary incentives to increase response rates, to link self-administered questionniare data with participant observation data, and to describe the recreational behavior of the dominant cultural group(s) in term of an expected land ethic. Bilingual interviewers contacted over four hundred participants at a dispersed recreation site on the Angeles National Forest .

The results indicate eighty percent of the day-visitors to the study area were of Latino heritage and they exhibited intensive-use behaviors in a dispersed recreational setting. Intra-group comparisons revealed significant differences in environmental perceptions and behaviors as over three-fourths of the Latino visitors indicated their place of birth was outside the United States.

CORPORATE RESTRUCTURING AND REGIONAL DEVELOPMENT: THE CASE OF THE NORTHERN REGION OF ENGLAND,

by Nick Phelps, Centre for Urban and Regional Development Studies, University of Newcastle-upon-Tyne, NE1 7RU, England.

This paper discusses the restructuring of mass producers as this affects the economy of a peripheral region; the Northern Region of England. It focuses upon the changing division of labour between firms in the region.

Preliminary empirical evidence is presented. Survey work provides an indication of the extent of vertical (dis)integration among the largest establishments from several sectors. Case study material demonstrates that the possibilities for 'linkage proliferation,' in the Northern Region, reflect the changing position of establishments within corporate-wide divisions of labour and can result from markedly different corporate strategies of restructuring. The case studies also show how capital concentration is quite consistent with vertical disintegration.

The paper contributes to the debate on "flexible production" by situating the empirical work within a critique of theories invoked to explain current trends in corporate restructuring. The paper argues for the adoption of theoretical approaches which recognise a wider definition of the firm but which also acknowledge differential power embodied in linkage structures.

UNSTABLE HYDRAULIC GEOMETRY AND EXTREMAL HYPOTHESES FOR RIVER CHANNEL BEHAVIOR

by Jonathan D. Phillips, Department of Geography and Planning, East Carolina University, Greenville, North Carolina 27858.

The at-a-station hydraulic geometry of stream channels is difficult to predict because only three of the four equations necessary for a determinate solution are available. Successful closure of the problem for specific situations has been achieved by assuming the hydraulic variables adjust to satisfy some hypothesized extreme, such as minimum energy dissipation or maximum friction factor. These and other extremal hypotheses have been found to be inconsistent with each other, and with observed behavior of river channels. The problem is reevaluated by viewing each extremal hypothesis as a particular mode of adjustment to externally-imposed conditions. Each mode of adjustment can be viewed as a system state. A qualitative asmyptotic stability analysis of an interaction matrix of the major hydraulic geometry variables shows that the system is unstable. Because an unstable system is likely to change states after a perturbation, the hydraulic geometry should exhibit different modes of adjustment described by different extremal hypotheses. This could explain the existence of several quite different solutions to the hydraulic geometry problem which are successful in some situations but not universally applicable.

MANAGEMENT OF COMPETING USES IN NORTH CAROLINA'S COASTAL WATERS

by Lynn R. Phillips, Carteret County Planning Department, Beaufort, NC 28516 and Walter F. Clark, UNC Sea Grant College Program, Raleigh, NC 27695.

Increased population in the North Carolina coastal region has led to greater usage of estuarine waters for recreational and economic purposes. This competition for a finite resource has caused significant spatial conflict among user groups including recreational boaters, commercial fishermen, land developers and conservationists.

These conflicts have been especially noted in Carteret County. Conflicts exist in Carteret County due to its importance in commercial fishing landings and revenue derived from the fisheries industry, and its wide variety of recreational attributes. In addition, land development and port-related activities have had secondary impacts on the quality and use of the surface waters and the military's expansion of restricted operation areas have excluded civilian users from some waters.

The principals of land use analysis are applied to water surface use to develop a model plan for the management of conflicting uses. Resource identification and prioritization provide a classification and spatial allocation of uses and resources requiring protection in the future.

RICE-FISH FARMING IN NORTHERN MALAYSIA

by R. Phillips, Department of Geography CSU-Sacramento, Sacramento, 95819.

Rice-fish culture has been practiced in Malaysia and elsewhere in southeast Asia and south China for a very long time. Farming practices and the fish species utilized vary from place to place; the Malaysian system is perhaps the least productive of those used in East Asia. Fish fry enter with the irrigation water and live in the rice field until harvest; there are no inputs to fish growth other than the small bit of land taken out of cultivation to provide a deeper pond (refugium) which is connected to the rice field.

This research was carried out in an effort to better understand the rice-fish system and to explore ways to make the fish portion more productive. The field research was carried out in the Krian area in the northwestern part of the State of Perak, about one hundred fifty miles northwest of Kuala Lumpur. Fish catches were examined and related to field area and aspects of the habitat. Among the conclusions is that the system is not very productive but that it has the potential for considerable improvement. If most of the aquatic weeds are removed from the refugium and more food is available for the fish (through feeding or the addition of organic fertilizers), especially early in the growing cycle, fish production will be much higher.

PUBLIC SCHOOL CLOSURES IN SASKATOON AND WINDSOR, 1978-88

by A. G. Phipps, University of Windsor, Windsor, Ontario N9B 3P4.

During the period from 1978 to 1988, 15 schools were closed by the public and the catholic separate boards of education in Saskatoon, and 19 in Windsor. This study compares the boards' decisions to close schools, and their outcomes in each of the cities. The data for the study are from agendas and minutes of board of education meetings, briefs and commentaries submitted at public meetings, and newspaper reports. Structuration theory provides the concepts for the interpretation to disentangle the local and the structural processes contributing to the outcomes.

The results are that, similarly between the cities, the closed schools were located in the present-day older urban neighborhoods. In addition, the boards derived their procedures for closing schools from the evolving handbooks for educational administrators. In contrast, however, the effectiveness of community reaction has varied between the cities. Furthermore, the actions of the two provincial governments have caused different types of competition between the public and the catholic separate boards for school properties. In other words, both the structural and the local social-political contexts in the two cities have contributed to the closings, and the consequences.

FROM NEIGHBORHOOD COHERENCE TO CELLULAR AUTOMATA : SOME ODD BEARING ON CANCER INITIATION by *Michel Phipps*, University of Ottawa, Ottawa, Ontario K1N 6N5.

The emergence of discrete spatial patterns can result from the interplay of various organizational rules. The Neighborhood Coherence Principle (NCP) is one of these rules. In simple terms it may be spelled out as follows: A state which exists in a site tends to impose itself onto the neighboring sites. A cellular automata model allows the testing of the theoretical properties of this rule. Simulations with this model have shown that the NCP possesses the ability to build up a spatial differentiation with a high level of organization (as measured by spatial redundancy). It also has the ability to maintain this organization.

These results suggest that many spatial systems might be able to create and maintain a differentiation only by virtue of their contact communications. An attempt to apply these notions to biological systems is quite natural. All biological tissues have been shown to have cell-cell communications (gap junctions) the role of which is not yet fully understood. Many published papers have recently reported experimental facts which suggest that tissue homeostasis could be achieved through NCP-like processes. By the same token the impairment of cell-cell communications could be responsible for the loss of control of the cell division cycle, and subsequently of cell proliferation. A new theory on cancer initiation has been established on these ideas. This theory allows for the formulation of empirically testable hypotheses.

SMITH ISLAND, MARYLAND AND VIRGINIA: A CULTURAL/ HISTORICAL GEOGRAPHY by James E. Pickett, Department of Geography, Towson State University, Towson, Maryland 21204

Smith Island, Maryland is the last permanently inhabited watermen community in the Chesapeake Bay accessible solely by boat. For some 300 years, popular belief has maintained that the islanders have enjoyed an idyllic life harvesting the bounty of the Bay.

The purpose of this paper is to dispel such myths, and concentrate on the periods of change that have affected life on the island. Certain critical problems are discussed including shoreline erosion, the general decline in the crab and oyster harvests, and various social difficulties ranging from the excessive consumption of alcohol to the decline in the importance of religion.

The results of this paper disprove the commonly held beliefs of what life on Smith Island is like, and divulge the problems currently in existence there. Finally, the possibilities concerning the continued existence of the island as a distinct spatial unit are discussed.

CONSOLIDATING NEIGHBORHOOD RETAILING by Frank Pietravoia, Cleveland City Planning Commission, 501 City Hall, Cleveland, OH 44114.

One of the greatest development challenges facing Cleveland is the re-establishment of competitive, attractive and convenient neighborhood shopping districts. The Cleveland Civic Vision 2000 comprehensive plan recommends a strategy aimed at consolidating and concentrating retail activity to strengthen retail shopping areas to better serve neighborhood residents throughout the City.

A survey conducted as part of the Civic Vision program revealed that current retail development in most Cleveland neighborhoods is too sparse and is scattered over too great an amount of land. Approximately 25% of land citywide zoned to permit retail businesses is vacant or occupied by vacant commercial buildings. Many existing commercial areas exhibit deterioration in the physical condition of buildings as well as in the quality of businesses. Cleveland residents have reacted to these conditions by spending an estimated $350 million each year outside of their neighborhoods, often at suburban shopping centers.

To help reverse this trend, the Civic Vision land use plan proposes to re-configure the presently scattered pattern of retail development at consolidated locations in every City neighborhood, so that the location and size of shopping areas is better matched to current and future needs of City residents. The plan proposes a hierarchy of shopping districts, differentiated by size, business types and spacing to meet the full range of shopping needs. To accomplish the proposed pattern of retail development the plan recommends a combination of upgrading and expanding existing shopping areas and development of contemporary shopping centers in areas which are currently unserved by appropriately-located retail districts.

PERCEPTIONS OF RISKS OF TRANSPORTING HAZARDOUS MATERIALS by K. David Pijawka, Alvin H. Mushkatel, and Joanne Nigg, Office of Hazards Studies, Arizona State University, Tempe, AZ 85282.

Although much has been reported on public perceptions of environmental hazards surprisingly little has been written on risk perceptions of transporting hazardous materials and especially nuclear waste. The paper presents the results of a public survey of 750 residents residing in the Las Vegas metropolitan area, a community through which the Federal government is proposing shipments of high-level nuclear waste.

The transportation of hazardous materials is a salient public concern and is ranked along similar perceived risk dimensions as other high risk-low probability technologies that involve chemical exposure. Variability in risk perceptions is not significant based on distances less than 5 miles from a shipment route. However, the nature of the substance being transported was found to be a significant factor, which shipments of nuclear waste perceived as presenting the greatest risk to the respondents. Most residents indicated a lack of trust in governmental regulations and enforcement to be effective in managing and reducing risk. Gender and occupational differences were significant variables in explaining variation in risk perceptions while other socio-demographics were not observed to be significant. When asked to rate transportation hazards relative to other hazards on a scale measuring levels of acceptable risk, transportation risks are more acceptable than those of chemical manufacturing plants, hazardous waste landfills, and nuclear facilities, but the risks are less acceptable than nonchemical manufacturing plants and sanitary landfills.

THE PROGRESSIVE PARADIGM AND ENVIRONMENTAL POLITICS by S. Pincetl, Graduate School of Architecture and Urban Planning, UCLA, Los Angeles, CA 90024

The Progressive Era has left a lasting and often unanticipated impact on American political life. While the Reagan era was more successful than any previous period in dismantling many Progressive structures, people's expectations of how politics should occur and how legislation (and hence, it is assumed, political change) is shaped, still comes to us from that period.

The U.S. environmental movement is now twenty years old, beginning with Earth Day in 1970. It is regarded as a model around the world. It has been largely dominated by a few nationwide membership organizations which are recognized by the media and politicians as legitimate representatives of the public's attitudes, wishes and desires regarding the environment. Yet these organizations have adopted the Progressive model regarding change: reform from above, a reliance on science and expertise to legitimate their claims; acceptance of the dominant economic structure and willingness to compromise for the sake of eccnomic stability and growth.

This approach has led to a growing alienation of more grassroot based groups, notably in the area of toxics, and a complete inability to understand let alone fight for, minority environmental concerns. In fact, there has been a deep schism between minority struggles and environmental ones when often the problems have the same origins.

This presentation will explore the Progressive legacy in detail and show how it has influenced the mainstream environmental groups and created growing dissatisfaction at the local level. I will explore some of the new developments in the grassroots and attempt to outline some avenues out of the Progressive political paradigm.

PROSPECTS FOR THE MANAGEMENT OF COMMUNAL FOREST RESERVES IN NORTHEAST PERU by Miguel Pinedo-Vasquez, P. Jipp, D. Zarin, Yale University Schhol of Forestry and Environmental Sciences, New Haven, CT 06511.

Communal forests and lake reserves may be found in a number of riverine villages affiliated with the Federacion Departamental de Campesinos y Nativos de Loreto (FEDECANAL) in northeast Peru. The reserves were established by the villagers themselves with the aid of FEDECANAL leader to protect and control the extraction of forest and lake resources. The reserves lack legal status but villagers actively guard their reserves against outside commercial extractors. Legal control of these communally protected land remains with the Peruvian Ministry of Agriculture. Conflicts over resource extraction are not uncommon. Resources extracted from the reserves include timber, construction materials, fruits, medicinal plants, fish, and game.

Working in one riverine community two hours downriver from the city of Iquitos, we conducted an inventory of a recently established communal forest reserve. Within the community we collected information about the uses of, and the markets for forest products. Market surveys were conducted in Iquitos.

The economic benefits of forest products extraction form one category of value inherent in a communal forest reserve. Non-commodity values such as, social equity and watershed protection are more difficult to quantify. For successful management of communal forest reserves to be sustained, base line ecological, economical, and social information must be gathered, interpreted, and put to use.

THE CONTESTED RISE OF LOS ANGELES IN THE GLOBAL FASHION SYSTEM by Beverley Pitman, Graduate School of Architecture & Urban Planning, UCLA, Los Angeles, CA 90024-1467

The shift from a garment industry based on style copying to a fashion industry based on a local design community signals the existence of organizational linkages that extend beyond production into the realms of high society and culture. Over time, the world's established fashion capitals -- Paris, Milan, New York, and to a lesser extent, London and Tokyo -- have developed and maintained these linkages to varying degrees, with the oldest, the Chambre Syndicale de la Haute Couture Francaise in Paris gradually yielding to the others. With the aim of determining the nature and extent of the linkages making up the fashion system, the paper traces the activities of the garment and fashion segments of the industry in Los Angeles, from the 1930s to the present, including attempts to establish the 'Made in California' label, the 'California Look,' an 'L.A. Style' and generally promote the city as a fashion capital. The examination finds that Los Angeles' bid for a place in the global fashion system has been a contested one, with divisions occurring along an art/industry axis and gender lines, as well as regionally and nationally.

TRACKING THE BABY BOOM, THE BABY BUST, AND THE BABY BOOM ECHO: IMPACTS OF SHIFTING AGE COMPOSITION ON U.S. GEOGRAPHIC MOBILITY, MIGRATION PATTERNS, AND REGIONAL DEVELOPMENT by David A. Plane, Department of Geography & Regional Development, University of Arizona, Tucson, AZ 85721, and Peter A. Rogerson, Department of Geography, State University of New York at Buffalo, Buffalo, NY 14260.

In this paper we examine recent evidence on how changing age composition has affected age-specific levels of geographic mobility and interregional patterns of migration. We focus on the implications of these relationships for the 1990s and the first part of the next century. We propose that the economic repercussions of large differences in the sizes of successive generations have important geographic dimensions, in addition to an overall effect on mobility that is a consequence of the economic theories of Richard Easterlin. These can provide us with solid clues about the future course of regional population growth and development. Of particular pertinence to our study are the large cohorts born during the post–World War II baby boom that lasted through the mid-1960s, the subsequent "baby bust" generation born during the period of lower fertility extending through the 1970s, and the larger cohorts of the baby boom "echo"—the first members of which recently entered elementary school. During the 1970s, highly "demographically effective" channels of core-to-periphery internal population redistribution were manifested as the baby boom cohorts flooded regional labor markets with large numbers of incremental entrants. In the 1980s, the force of these trends have dissipated, but not been spent, as baby boomers have entered more sedentary ages and the baby bust generation has been providing reduced labor-force entry pressure. By the year 2000, the children of the baby boom echo will begin coming of age, again increasing the supply of young entrants, concomitant with the first of the baby boom cohorts reaching the ages of the "retirement bulge" of the national migration age schedule.

ECOLOGICAL PERILS OF GLOBAL URBANIZATION: LESSONS FROM THE 19TH CENTURY EXPERIENCE IN THE DEVELOPED WORLD by Rutherford H. Platt, University of Massachusetts, Amherst, MA 01003

World population has nearly quadrupled during the 20th Century from 1.6 billion in 1900 to 5.1 billion in 1987 and may reach 6.25 billion in 2000. Meanwhile, the population living in urban places has grown ten-fold from 224 million in 1900 to 2.2 billion in 1987, rising from 14% to 43% of total world population Much of this urbanization has occurred in the Third World where the number of conurbations exceeding four million rose from five in 1950 to 28 in 1985, and could reach 114 by 2025. Such rapid urbanization, under conditions of extreme poverty and often political instability, poses diverse and intractable ecological implications. These include, e.g., deforestation for fuelwood, urban encroachment on cropland, air and water pollution, rising levels of risk due to riverine and coastal flood, land subsidence, landslides, seismic, and fire hazards, and disease.

In responding to these interrelated perils, new institutional and technological measures are required. The situation resembles qualitatively, if not quantitatively, the crisis of rapid urban growth faced by the cities of Europe and North America during the early industrial era of the 19th Century. The experience of those cities in coping with their own rapid expansion may provide inspiration to beleaguered public officials and managers of Third World conurbations today.

DEPICTING SHORELINE CHANGE FROM DIGITALLY ENCODED AERIAL PHOTO INTERPRETATIONS, by Gregory A. Plumb, University of Oklahoma, Norman, Oklahoma 73019, and Michael W. Corkran, U.S. Army Corps of Engineers, Tulsa District, Tulsa, Oklahoma 74121.

The Eufaula Lake (Oklahoma) Shoreline Erosion Study is a case study in applying geographic information systems and computer mapping technologies to the detection and monitoring of shoreline change. Integration of these capabilities with traditional techniques of air photo interpretation can enable investigators to reconstruct changes in shoreline throughout the 25-year history of the reservoir.

The level of confidence in predicting the extents, rates, and trends of shoreline erosion is a function of the accuracy for digitally encoding individual shorelines over multiple dates of aerial photography. Factors that contribute to locational mapping error include photographic scale, degree of uncertainty in correctly identifying shoreline features, and imprecision in georegistering the air photos. Thus, incorporation of locational error is essential for properly depicting map and tabular shoreline data. Otherwise the output data can be misleading and compromise the work of project managers, environmental planners, real estate specialists, hydrologists and others in their management of lake resources.

ECONOMIC GROWTH AND TRADE by Jessie Poon , Department of Geography, Ohio State University, Columbus, Ohio 43210

The relationship between economic growth and trade has been controversial in development literature. During the early post-war period, there was extensive pessimism about developing countries' ability to grow via export-led strategy. Consequently, the adoption of import-substitution industrialization became the cornerstone of development policy. With the rise of the newly-industrializing countries as major exporters of cheap consumer products to industrial countries, considerable debate has re-surfaced over the role of exports in leading growth among developing countries.

This paper attempts to identify the relationship between economic growth, and, trade and some index of economic development. In order to test the impact of the explanatory factors, the expansion method due to Casetti is used. Using data for a number of countries in the post-war period, the nature of the above-mentioned relationship is examined. Finally, some policy implications are drawn in the conclusion.

INVENTORYING URBAN NATURAL AREAS IN PORTLAND, OREGON by Joseph Poracsky, Portland State University, Portland, OR 97207-0751.

The preservation and management of natural areas within urban environments has recently begun to attract increased attention from planners and administrators. During late 1989 and early 1990 an inventory was performed of the natural areas within the Portland, Oregon metropolitan region. The inventory included the preparation of a map at 1:24,000 scale from color infrared aerial photography and a set of site descriptions based on field inventory. The map delineated sites by broad categories and the site descriptions provided finer levels of detail on vegetation communities, the presence of unique/fragile plant species, and the quality of fish and wildlife habitat.

These data are being incorporated into a spatial database along with information on zoning, current and projected land uses, ownership, transportation plans, E-Zone overlays and wetlands designations. The database information provides the basis for identifying areas of regional, local, and neighborhood importance, assessing changes in the extent of natural areas in recent years, developing a short-term strategy for the monitoring and protection of natural areas, and developing a long-term plan for the acquisition, permanent protection and management of metropolitan natural areas.

SEARCHES FOR SOCIAL THEORY IN GEOGRAPHY AND GEOGRAPHY IN SOCIAL THEORY by Philip W. Porter, Department of Geography, University of Minnesota, Minneapolis, MN 55455

Over the years geographers active in the "human use of environment" theme within the discipline have sought to identify distinctive theories of use and value. In part the enterprise was taken in emulation of the development of theories in the domain of "spatial interaction and spatial structure." There have been symposia, IGU Study Groups, and seminars devoted to the task. What has emerged from the effort? The paper reviews a number of efforts at different periods from the 1960s through the 1980s. One conclusion is that with the exception of time-geography, no distinctive theory (that is, theory apart from the social sciences generally) has been forged. Another conclusion is that for any theory to become useful and widely adopted, it must accomodate itself to the grand theories prevalent in the social sciences. Current discussion of structuration among geographers marks an effort to build geographical content and methods into analysis of societies, but we still have a long way to go.

GRAIN SIZE: A PROGRAM TO AID PEDOLOGIC PARTICLE SIZE ANALYSIS by Mary Catherine Prante, University of Kansas, Lawrence, KS 66045.

This program was developed to assist with particle size analysis of soil samples. The program is designed to run on an IBM compatible microcomputer with standard XT configuration using an MX80-type printer. Input data for soil samples are contained in a textfile. Each line in the textfile comprises one sample, and consists of a series of cumulative percent values (for sieve sizes 1000, 500, 250, 100, 50, 20, 5, 2, 1, 0.5, 0.25 microns, respectively) and the sample label. Output consists of a print-out of the sample label, the sieve sizes and corresponding cumulative percent values, a display of the cumulative percent curve (which may be printed if desired), and a print-out of several statistics for the data. These statistics are: seven phi percentile values (5th, 16th, 25th, 50th, 75th, 84th, and 95th), the Inclusive Graphic Standard Deviation (sorting), the Inclusive Graphic Skewness, the Graphic Kurtosis, the Graphic Mean, and the mean of the seven phi values. Each page printed represents one sample's output (whether the graph is printed or not), and the program will continue to execute until the end of the data file is reached.

ON THE REPRODUCTION OF ACADEMIC DISCOURSE: CLASS AND THE SPATIAL STRUCTURE OF THE CITY by Geraldine Pratt, Department of Geography, University of British Columbia, Vancouver, British Columbia, V6T 1W5.

This paper examines geographers' contribution to understanding the ways in which urban spatial structure mediates the social reproduction of class relations in capitalist society. Conceptions of these processes have tended to evolve over the past fifteen years, away from functionalist theories drawing on social control metaphors to more open-ended and multi-faceted understandings of the social reproduction process. I intend to probe certain tensions and silences that nevertheless surround the three concepts that anchor the paper: social reproduction, class and urban space. With reference to class, I wish to consider the problems of conceptualizing the social reproduction of class in isolation from other social categories, such as gender and ethnicity. As with social reproduction more generally, there is a potential to reproduce existing discourses (in this context, a masculinist one) or to forge new theoretical categories and relationships.

CHANGES IN SPATIAL PATTERN DURING SUBALPINE FIR FOREST DEVELOPMENT by Francis Precht, Department of Geography, Frostburg State University, Frostburg, Maryland 21532.

The spatial pattern in two subalpine fir (*Abies lasiocarpa*) forests in the northeastern Olympic Mountains was examined. Changes in point pattern were related to stand structure, stage of forest development and competitive interactions among overstory and understory stems. A Cartesian coordinate system was used to locate, map and measure all live tree stems. Combined count-distance analysis was used to assess univariate and bivariate spatial point pattern and understory/overstory interactions.

The two subalpine fir stands lie at different points along a continuum of change in their respective forest development sequences. The first stand was representative of a canopy thinning stage, whereas the second stand was in a later phase of development typified by understory re-initiation. Changes in univariate spatial pattern were revealed for both stands, from aggregated understory stems to less-aggregated overstory trees. Similar shifts in bivariate point pattern were also revealed during forest development. Spatial attraction among understory and overstory trees was shown to change to more repulsive relationships in later stages of forest development. Symmetric and asymmetric competition imposed at different times and strengths during stand development are the suggested causes shaping spatial pattern.

THE WORLD INSIDE OUT AND UPSIDE DOWN: SOUTH KOREAN CAPITAL AND SYMBOLIC DISCONTENT IN A CALIFORNIA INDUSTRIAL TOWN by A. Pred, Department of Geography, University of California at Berkeley, Berkeley, California, 94720

Languages of everyday life are always in some measure transformed-- through the introduction of new practices and associated power relations-- as they intersect with geographically and historically specific forms of capitalism. Since new or altered relations of production always confront some pre-existing forms of culture and tradition, they are apt to precipitate struggles over meaning and other linguistic expressions of discontent. This paper deals with an inverted instance of Third World capital penetrating a First World local culture. It briefly tells a story of South Korean capital invading Pittsburg, California (through the formation of a joint venture with U.S. Steel), a story of several labor disputes associated with the renovation and expansion of an out-of-date steel plant. Struggles over meaning, over the representation of identity and the legitimacy of taxonomies, are shown to be very much at the heart of the resistance thrown up by local workers confronted for the first time by agents of foreign-based, rather than domestic, capital.

ETHNICITY, GENDER AND URBAN LABOR MARKETS by Glenda Laws, The Pennsylvania State University, University Park, Pa. 16802 and Valerie Preston, York University, Toronto Ontario, M3J 1P3

Recent geographical research examining gender has often disregarded the diversity of women's experiences. The interaction between gender and other factors that influence patterns of segregation within labor markets is rarely considered. What has happened to the labor markets of immigrant women as urban economies have restructured spatially, and the central city has become characterized by highly skilled professional jobs in the service sector, and low-wage, less skilled jobs in services and informal manufacturing activities? We explore the effects of gender, ethnicity and class on labor markets in New York to determine the extent to which immigrant women are still employed in inner city sweatshops. Using data from PUMS, the occupational, sectoral and spatial dimensions of immigrant women's segregation in the labor market are examined empirically. The effects of nationality, language, length of residence in the United States, and education on spatial patterns of employment for immigrant women are examined first. Analysis of variance is used to compare the labor markets of immigrant women, immigrant men, and American-born women. As expected, immigrant women experience the most severe sectoral and occupational segregation, however, spatial segregation of employment is less pronounced.

IMPACTS OF FLUCTUATING GREAT LAKES LEVELS AND FLOWS ON ELECTRIC POWER GENERATION by B.Price, Corps of Engineers; R.Chang, Min. of Natural Resources; K.Irvine, Buffalo State College; T.Muir, Environment Canada; R.Guido, Corps of Engineers.

The possible impacts of fluctuating Great Lakes levels and flows on the electric generating industry are qualitatively evaluated. Approximately 94,400mW of hydro and thermal power could be affected. This represents 39% of the total installed capacity within the 8 states and 2 provinces that border the lakes. Within a range of fluctuations around long term averages, power can be reliably generated to meet current demands with associated environmental, economic and social impacts. The greatest adverse consequences would result from extreme low levels, with power shortages expected during prolonged droughts. Transmission limitations would not enable make-up of shortfalls through power imports. Additional lake level controls and associated new or modified regulation plans would do little to ameliorate the adverse consequences. Drought contingency planning that includes non-structural measures such as conservation, off peak use, voltage reductions and scheduled outages would be more effective in dealing with the adverse consequences.

IMPROVEMENTS OF LAND COVER CLASSIFICATIONS DUE TO REMOVAL OF THE TOPOGRAPHIC EFFECT FROM LANDSAT DATA by D. Cohan, College of Natural Resources, Utah State University, Logan, UT 84322, and Dr. Kevin P. Price, Geography Department, University of Kansas, Lawrence, Kansas 66045.

Undesirable topographic effects are inherent in Landsat spectral data acquired over areas of rugged terrain. The removal of the topographic effect from raw satellite data results in improved land cover-type classification accuracy. In this paper we present a model used to reduce the topographic effect from satellite imagery and show how improved classification accuracies result from this procedure. Landsat-5 Thematic Mapper data of a mountainous region of Northern Utah is used in this study.

The model computes scaling factors used to adjust pixel brightness values for the removal of shadows. This is accomplished using a Geographic Information System which accesses satellite imagery, digital elevation, slope and aspect data on a per pixel basis. Pixel adjustments are based on the reflectance properties of electromagnetic radiation which are dependent on the geometric configuration of the solar position, surface slope and aspect angles, and the satellite position. Preliminary statistical analyses indicate a 17% increase in classification accuracy from adjusted imagery as compared against unadjusted imagery.

HANDS FOR THE COFFEE: MIGRATION INTO WESTERN VENEZUELA'S COFFEE LANDS 1870-1930 by Marie D. Price, Department of Geography, Syracuse, New York 13244-1160.

The coffee cultivation boom which swept through Latin America in the late 19th century profoundly altered the economic development of several highland areas, including the western Andes of Venezuela. Down the forested slopes of Tachira, Merida and Trujillo states, spread the peasant farmer with his coffee bushes and subsistence crops. By 1900, small family farms had turned the isolated Venezuelan Andes into a vital economic region that supplied the country with its leading export. Land and marriage documents from the local civil registries are the primary sources used to detail the patterns of migration and the process of land acquisition. The lure of profits and the availability of fertile public lands attracted thousands of peasants from the higher colonial towns in Venezuela and Colombia to seek opportunities down slope in the tierra templada. While government sponsored programs to draw European migrants largely failed, spontaneous migration from the highlands provided the necessary manpower to support the labor-intensive coffee economy. Since land was widely available during the 19th century, peasant farmers could forego the low wages and niggardly tenancy arrangements offered on the large estates and cultivate their own land. This relative independence fostered a sense of prosperity and hope for the future. Yet as with most primary exports, the collapse of the world coffee market in 1929 shattered the dreams and the independence of peasant producers.

SPATIAL IMPRINTS OF ISLAM ON THE LANDSCAPE OF TRINIDAD

by Mohammad Hemmasi, University of North Dakota, Grand Forks, ND 58202 and Carolyn V. Prorok, Slippery Rock University, Slippery Rock, PA 16057.

Following the abolition of slavery in 1834, demand for labor on Caribbean plantations was met by importing laborers from Asian British colonies. Indentured Indians arrived in Trinidad in 1845, a process which lasted until 1917. Immigrants, mostly consisting of Hindus and Muslims from eastern and north central India, settled in Trinidad, thereby adding another group to the already varied culture groups of the island. By 1988, over 83,000 Muslims, comprising 6.5% of the total population, lived here. This study examines spatial imprints of the Muslim minority on the cultural landscape of Trinidad. An analysis of survey data on 98 mosques, together with census information, reveals the spatial patterns and the diffusion of Islamic institutions and their architectural forms. A comparison of representative mosque structures in Trinidad, with landmarks of Old World Islamic prayer sites, helps to determine the origin, causes and diffusion paths of Islam to the New World. Factor analysis of a matrix of 15 variables measuring the attributes of Trinidad's mosques generated three basic dimensions of size, distribution, and elevation. Maps of these factors facilitated interpretation of the spatial aspects of Muslim population distribution and religious institutions, which conspicously mark the skyline of the island.

COMPARISON OF ELEVATION VALUES FROM THREE DATA SOURCES

by Rudy Prosser, Department of Geography, San Diego State University, San Diego, CA, 92182

In 1988 the citizens of San Diego were asked to vote on a series of initiatives placing limitations on development within the city and county. Several of these initiatives used slope as a limiting criteria. The San Diego Association of Governments (SanDAG) has been interested in using GIS to create slope maps needed to monitor development. The accuracy of these maps depends on the data used to create them, in part the elevational accuracy.

This project compares elevation values taken from three different sources: USGS 7.5 minute quad sheets, USGS Digital Elevation Models (DEMs), and 1:2400 orthophoto maps. Four adjacent quadrangles for which DEMs and orthophotos maps were available were selected. Contours from 4 160-acre samples were digitized from each quad sheet and corresponding orthophotomaps, and, along with the DEM, processed using the TIN module of ARC/INFO to produce a regular lattice of elevations. Elevations were then interpolated from each lattice in a regular pattern as established by the DEM. These elevation values were then compared using a variety of statistical tests to determine relative elevation accuracy.

Preliminary results indicate that there is close agreement in elevations between the digitized quad sheets and orthophoto maps, and disagreement between both these and the DEM, and that for large scale mapping of slope either the quad sheet or orthophoto maps are adequate.

THE MANAGEMENT OF TOXIC WASTES IN THE SOVIET UNION by Philip R. Pryde, Department of Geography, San Diego State University, San Diego, CA 92182.

The safe handling and disposal of toxic wastes constitutes a significant problem in the Soviet Union, as it does in all other industrialized countries. In the present era of *glasnost'*, articles have more frequently appeared in the Soviet press detailing incidents involving toxic wastes, but no well organized program to cope with this growing problem existed in 1989.

Environmental contamination has been reported involving a wide array of toxic wastes. Residuals from industrial operations not infrequently escape beyond factory bounderies; local contamination by toxic metals and PCBs have been reported in several areas. The USSR last year acknowledged the occurrence of a severe accident in 1957 involving high-level radioactive wastes at a storage site in the Ural Mountains, and recent incidents involving improperly stored low-level radioactive wastes have been reported. Pesticides continue to be heavily employed in agriculture and forestry, with periodic reports of wildlife losses, and DDT, officially banned twenty years ago, is reportedly still being used.

The Soviet approach to toxic waste management is for individual enterprises to be responsible for disposing properly of any hazardous wastes they generate in their operations, but this does not always occur. There is no Soviet equivalent of the "superfund" in the United States to provide a separate monetary account for toxic waste clean-up, nor does there appear to be at present any centralized agency with tight supervisory powers over Soviet toxic wastes. This role may fall to the new State Committee for Environmental Protection ("Goskompriroda"), and the future procedures for better handling the nation's hazardous wastes may be spelled out more fully in the forthcoming "State Ecology Program", which is now in preparation.

INTERNATIONAL CONCERN FOR SEA-LEVEL RISE ISSUES by Norbert P. Psuty and Vasanti Jogoo, Center for Coastal and Environmental Studies, Rutgers - The State University of New Jersey, New Brunswick, New Jersey, 08903.

An emerging interest is being shown in many countries regarding the issue of sea-level rise and its impacts. The overall concern is directed in several ways, but in general it is a recognition that sea-level rise is occurring and that it is another variable that must be taken into account in planning for coastal land use. Two recent international conferences, one in Florida and the other in Australia brought together representatives from most of the world's nations to present their views on the risks posed by rising sea level in their area. Under the aegis of the Intergovernmental Panel on Climatic Change, the assembled scientists and administrators discussed the far-flung ramifications of the inundation of the coast, the estuaries, and lagoons. The disruption of the natural and economic systems and the variable opportunities to adjust spatially to new or attenuated systems is a major concern. Of critical importance to future adaptation is the institutional response to the changing systems and the sharing of planning strategies and techniques.

AN HISTORICAL GEOGRAPHY OF THE PRESIDIOS ALONG THE NORTHERN FRONTIER OF NEW SPAIN FROM 1759 TO 1788 by Frank J. Pucci, University of Minnesota, Department of Geography, Minneapolis, MN 55455

Control over the northern colonial marches of the Spanish empire in the New World during this time period was tenuous and expensive, but because of the new threat of foreign incursions by England and Russia, Charles III was determined to increase the Spanish presence in the region. To combat these foreign threats and gain firm control of the frontier, the Marquis de Rubí was directed by the king to conduct an inspection of the presidio defense line and make recommendations for its improvement. Rubí's inspection was conducted over a two-year period, 1766 to 1768. He was accompanied on his tour by army engineer Nicolas de Lafora and it is the maps and notes of the engineer that provide the basis for this discussion of the repositioning of the presidios at new sites.

The results of the inspection and Rubí's recommendations brought about the issuance, in 1772, of a royal Reglamento reorganizing the presidio line geographically and administratively. The reorganization was carried out by Hugo O'Conor over a period of five years, 1772-1776. The changes reflected the attempts by Charles III to make his colonial possessions more efficient, more economical, and safer from foreign invasion. The reorganized presidio line was also designed to stem the numerous depredations carried out by the Apaches against the colonists and friendly Indians inhabiting the frontier zone.

SEA-LEVEL AND COASTAL TECTONIC HISTORY OF FUJIAN, SOUTHEAST CHINA by Hong-lie Qiu, Louisiana State University, Baton Rouge, LA 70803

The morphology of modern Fujian coast is the combined result of eustatic sea-level changes and local tectonic movements since the late Pleistocene. Many alleged former coastal features such as peat horizons, beachrocks, oyster beds, and marine sands have been dated to reconstruct local tectonic and sea-level history. However, questions concerning the magnitudes and extent of the late Pleistocene and Holocene marine transgressions remain unsolved, mainly because of the uncertainties in both dating and former depositional environments of the dated materials. This study seeks to clarify those uncertainties and provide better marker horizons for the study of local tectonic history. A fieldtrip to Fujian was conducted to collect geomorphological and sedimentological evidences of marine transgressions in Fujian. Samples were taken from several key sediment units in Fujian coast. Pollen and grain size analyses are performed to shed light on the interpretations of the local sea-level and tectonic history.

THE NEGATIVE EXTERNALITIES OF PRISONS by Joel Quam, Indiana University, Bloomington, Indiana 47405

Centers for the confinement of criminals, commonly known as prisons but also referred to as penitentiaries, correctional institutions and so forth, are recognized by the general public as noxious facilities. That is, these are facilities which are perceived to have a negative impact on the quality of life of the neighborhood, community or region in which they are located.

At times the negative impact of a noxious facility is felt across political boundaries. Under these circumstances a negative externality is present. Analysis of the location of state and federal prisons relative to state and county borders will reveal the frequencies with which prison sites result in negative externalities. I will compare the actual frequencies with expected frequencies derived from binomial probability distributions.

I then will demonstrate the extent to which geographic placement of prisons is such that resulting negative externalities are more numerous than could be expected through a random choice of locations. In other words, does the geographic choice of prison sites show a non-random tendency toward border locations?

THE NEW CONTENDERS: DEVELOPING COUNTRIES AS TECHNOLOGICAL INNOVATORS by Carlos Quandt and Rebecca Morales, Graduate School of Architecture and Urban Planning, UCLA, Los Angeles, CA 90024.

The current phase of advanced industrialization is characterized by rapid global economic integration and expanding rates of international trade and competition. The working hypothesis of this paper is that the present context of increased interdependency contains conditions that have induced not only a realignment of North-South economic relations, but also the emergence of globally competitive technological capacity in selected developing countries. These new contenders effectively challenge the prevailing views of Third World countries as either suppliers of primary products or subordinate members of global production strategies, specializing in low value added products and standardized, obsolescent technologies.

This paper draws examples from several industries in order to illustrate how this is occurring. The objectives are: 1) to develop a theoretical framework that encompasses a typology of the particular groups of industries and industrializing countries in terms of their advances in factors that are critical for promoting innovation and risk-sharing, such as the expansion of scientific and technological infrastructure and the integration of Research and Development capabilities among industry, government and university centers; 2) to explore the geographical implications of the changing global stance of these countries as they increase their ability to select, adapt, diffuse and develop technical knowledge. These factors are associated in varied degrees with the promotion of domestically oriented development objectives, the emergence of regional patterns of technological transfer and trade, as well as their rapid rise to prominence as active developers of frontier technologies and vigorous competitors in the world economy.

WILL FREE TRADE DRINK CANADA DRY? by Frank Quinn, Environment Canada, Ottawa, Ontario, K1A OH3

During the great national debate in 1988 over free trade with the United States, some critics in Canada charged that water resources would be subject to the terms of the trade agreement. The response of the Government of Canada was, first, to deny any such possibility, then to initiate legislation banning large-scale water export. Analysis of the opposing positions and of related events is inconclusive at this time. For the next few years, however, there appears to be too much opposition in Canada and too little interest in the United States for continental water marketing to be taken seriously.

But Canada's water resources may be implicated by the free trade agreement in another way than by diversion of lakes or rivers across the international boundary. Rather than commit water for export, three provinces are exploring the economic rewards of building water projects for the generation of electricity which would be committed entirely for export. Quebec, Manitoba and British Columbia are pursuing electrical markets in the United States which would have the effect of tieing up northern water systems for long periods in advance of domestic needs and in spite of abundant evidence of environmental and social disruptions caused by existing hydroelectric development.

LOST IN SPACE? THE USE OF URBAN SPACE BY INDIVIDUALS LABELLED AS DEVELOPMENTALLY HANDICAPPED by Glenda Laws, The Pennsylvania State University, University Park, PA 16802 and John Radford, York University, Toronto, Ontario M3J 1P3

Individual action spaces and social networks for people labelled as developmentally handicapped were analyzed through interviews and consultation with service providers. The objective of the research was to establish the relationship between the action spaces and community participation levels of the sample and their locational settings. The experiences of the interview respondents suggest that their lives have not been "normalized" as the architects of the deinstitutionalization process had hoped. Rather, social constraints, such as restricted income and job opportunities, combined with medical and physical restrictions (the source of the handicap label), produce relatively limited action spaces. This paper focuses on the qualitative findings from the survey in order to present the respondents' views on their quality of life in a large urban area (Metropolitan Toronto).

INDIGENOUS REFUGEES: A GLOBAL QUEST FOR JUSTICE. by Cheri Ragaz Dept. of Geography, University of Zürich, 8057 Zürich,Switzerland

This paper examines the dynamics of displacement which are forcing indigenous peoples out of their traditional habitats. The discussion takes into consideration the current situation of indigenous refugees which includes political, legal and philosophical issues.

Recent activity by indigenous peoples' organizations at an international level unites their demands for self-determination with those which are economic and cultural and which may be classified as land-rights. The custodial attitude of indigenous peoples toward land and life is being strongly challenged by multinational development banks and transnational corporations. It is anathema to indigenous peoples that land be treated as a commodity to be commercially exploited and abandoned. National development projects involving dislocations, uproot millions of indigenous persons without even adequate coverage of rehabilitation costs. Industrial contractors exert powerful political influence on governments and lending institutions. Indigenous peoples, locked out of power structures which determine their fate have been marginal to the development of the wider society. They are the most vulnerable link in the development chain. Relocation programmes menace the entire land base of indigenous peoples and therefore their economic, social and cultural integrity, jeopardizing their survival.

Despite diversity in geographic distribution of indigenous peoples and in relationships between dominant societies and indigenous societies, an increasingly unified approach by these peoples in terms of aspirations and goals, transcending national and ideological frontiers, is currently being observed resulting in unity within diversity.

TRADITION, CULTURE AND IMPOSED SOCIAL AND ENVIRONMENTAL CHANGE IN INDONESIA. by Cheri Ragaz Dept. of Geography University of Zürich, 8057 Zürich, Switzerland

The future role of tradition - as the logic of empirically valid systems of knowledge about the real world - and culture, under inevitable penetration of induced social and environmental change (with regard to global shifts in capital) in Indonesia, provides the backdrop for this paper on local effects of political strategies employed by the state to develop and transform the society. Theoretical and actual aspects of culture and tradition within this changing framework will be discussed together with ideological convictions and perceptions of the various actors involved. This concerns interaction between villagers and the state and the resilience of traditional and cultural approaches to problem-solving compared to those dictated from above. Traditional religious statements do not lend themselves to politically-enforced adherence to the officially recognized main world religions. These differences are also manifest in the economic sphere where traditional patterns of consumption, and ownership (particularly with regard to land) are at odds with the interests of the national entrepreneurial class and present a major source of conflict and misunderstanding. Traditional ritual systems for regulating critical environmental relations are ignored by the state which in turn imposes new regulatory systems based upon civil law. There is a polarity of perceptions between those who plan and those who are to act on those plans.

SOIL LOSS IN RELATION TO TRADITIONAL AGRICULTURAL PRACTICES IN MEXICO by Steven J. Rainey, Department of Geography, The University of Texas at Austin, Austin, Texas 78712.

Steep mountain slopes can seldom maintain farming practices that are suited to more level terrain. They are highly susceptible to sudden, accelerated, and irreversible soil loss when vegetation is removed. Accordingly, if cultivation methods in such environments are not prudent, hillslopes can lose topsoil and the ability to support crops. In most cases, farmers without access to adequate capital or other economic opportunities suffer the consequences of such a scenario. Often, solutions offered by governmental or developmental agencies offer little improvement to the above situation because they do not take local environmental factors and the goals of local agriculturalists into account.

Traditional farmers have developed many techniques for producing crops in mountainous or hilly terrain without inducing excessive soil erosion. These methods include the planting of cover crops and the modification of slope topography by building terraces.

Observations made in the northern portion of the state of Hidalgo, Mexico in the fall of 1987 and in the spring of 1989 indicated that local farmers successfully cultivate on slopes with gradients of up to seventy percent without using any readily apparent erosion control devices. Field research conducted in the area during the summer of 1989 provided insights into the constraints faced by people farming in a marginal area: in this case a mountainous region of steep slopes and narrow valleys. The results of field observations on erosion are compared with those of interviews conducted with several local farmers in an effort to reconcile the perceptions and goals of the professional resource manager with those of the farmers themselves.

A TRANSPORTATION PLANNING SYSTEM FOR BANGLADESH by Bruce A. Ralston, Department of Geography, University of Tennessee, Knoxville, Tennessee 37996-1420, Cheng Liu, Transportation Center, University of Tennessee, Knoxville, Tennessee 37996-0700, and Linda I. Ralston, The Matrix Group, 2310 King Pl NW, Washington, DC 20007.

This poster is based on our experience in developing a PC based decision support system for transportation planning in Bangladesh. This system, which was developed for the World Bank, required integrating analytic transportation analysis tools such as modal split estimation, mutlimodal path assignment, and equilibrium trip assignment with traditional GIS approaches such as map layer display, graphic database inquiry (pointing at a map element to recall its database record), on-screen path analysis, and graphics based network editing. Issues such as model types, data availability, and interfacing data structures suitable for network analysis with those suitable for GIS based data management were addressed. The poster presents the results of empirical tests of the package for predicting the movement of eight major commodities in Bangldesh.

THE POLITICAL ECONOMY OF INDUSTRIALIZATION IN TRINIDAD AND TOBAGO by Davin Ramphall, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, LA 70803.

The international capitalist system can be characterized as core-periphery in structure. At the core are the developed capitalist countries; at the periphery are the developing capitalist nations which are heavily dependent on the core for factor inputs. The strong links between the core and the periphery have led to the creation within the latter of structures of "dependent capitalism" which constrain efforts at autonomous development.

The paper examines the development experience in Trinidad and Tobago within this framework of dependent capitalism. In the late 1950s this twin-island state embarked on a strategy of import substitution cum export promotion industrialization heavily dependent on factor inputs from the advanced capitalist nations. By the late 1970s this industrialization strategy, operating within the framework of dependent capitalism, was judged a failure since it failed to solve the islands' socioeconomic problems.

The coincidence of several developments in the early 1970s--the discovery of large local deposits of petroleum and natural gas, the fivefold increase in international oil prices and the emergence of a nationalist politics in the Caribbean region--has led to a new development strategy in Trinidad and Tobago based on energy intensive industrialization. Under this strategy foreign multinationals have been invited to form joint ventures with the government in iron and steel, urea, methanol and liquid ammonia production. Present evidence seems to indicate that the energy-based strategy is also operating within the framework of dependent capitalism. It has impinged only slightly on the local basic goods economy.

WRDA, 1986 - OPPORTUNITIES FOR U.S.-CANADA COOPERATIVE RESEARCH ON THE GREAT LAKES by Robert Ramraj, Geography Department, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin 53201.

In 1986, Congress passed the Water Resources Development Act (WRDA) which mandated, among other things, that research be undertaken on several pertinent issues affecting the Great Lakes. Several issues specifically mentioned in the Act are worthy of cooperative research between the United States and Canada. These issues may be categorised as (a) Geomorphological (shoreline erosion, ice behaviour and control, beach nourishment, flood control); (b) Hydrologic (the measurment of water diversion from Lake Michigan, measuring evaporation over and water consumption from the Great Lakes); Environmental (the effects of dredging and the disposal of polluted dredged material, beneficial uses of dredged material such as beach nourishment and the creation of wildlife habitat); and Economic (shipping tolls and user fees, harbor maintenance tax, assistance to farmers to transport and market their produce, compensation for shoreline damage, and benefits of increased riparian land values).

The shared knowledge obtained from this cooperative undertaking may be invaluable towards making the Great Lakes more sustainable and habitable.

MODELING TOPOGRAPHIC EFFECTS ON REMOTELY-SENSED IMAGES IN NORTH CENTRAL UTAH ASPEN FORESTS by R. Douglas Ramsey, Department of Geography, College of Natural Resources, Utah State University, Logan, Utah 84322-5240.

Detecting spectral variability within one cover type in areas of high topographic relief is constrained by the effects of slope aspect on solar irradiance. It has been demonstrated that the average reflective maximum within a cover type comes from the southeast facing slopes, the direction most orthogonal to the direct soar beam. Work in aspen forests in Central Utah has shown that the major component in unsupervised spectral class selection within one cover type is slope aspect. This factor reduces the ability for remotely-sensed data to detect variations, due to canopy characteristics. This paper describes a mathematical model, coupled with a Geographic Information System, which calculates potential direct beam solar irradiance for any latitude, slope aspect, slope, month, day and time of day. By calculating the equivalent latitude of a given slope, the reduction of solar irradiance can be calculated and standardized to a latitude orthogonal to the solar beam at a given point in time. This coefficient, when applied to spectral reflectance values for given slope aspect and percent slope, reduces topographic effect.

PRINCIPLES OF IN-SITU BIOLOGICAL TREATMENT by Willie B. Rand, Jr. Northeastern Illinois University, 5500 N. St. Louis, Chicago, Illinois 60625-4699

The in-situ biological treatment of contaminated soils and ground waters is on-the-one hand a new technology; while on the other hand it is an extension of basic biological waste water engineering. The principles that govern in-situ biological treatment are basically the same that have been used in sewage and industrial waste treatment. These principles are the proper supply of oxygen and nutrients. The adaptation of bacteria to waste streams and the sensitivity of biological systems to environmental conditions are significant. The lessons that have been learned from conventional waste treatment can be successfully applied to in-situ treatment. What makes in-situ biological treatment, however, a new technology is the fact that its successful application also requires a thorough integration of the principles of hydrogeology. The control of a biological process in a soil water matrix is inherently more difficult than in a conventional waste water reactor. Not only are the transport processes more complex but the chemistry of the soil water matrix can have substantial impact on the biology. Successful application of in-situ biological treatment, therefore, requires an understanding and integration of hydrogeology, chemistry and microbiology.

"MINETOWN, MILLTOWN, RAILTOWN" REVISITED: A REINTERPRETATION OF THE ECONOMIC WAY-OF-LIFE IN CANADIAN COMMUNITIES by J.E. Randall, Department of Geography, University of Saskatchewan, Saskatoon, Saskatchewan, S7N 0W0.

Lucas's 1971 book on single-industry communities set the standard in the description and explanation of society within relatively isolated communities. Our understanding of the economic fabric of these communities focuses on the power exerted by externally-controlled corporations, a narrow industrial and occupational structure, rampant unemployment, and instability. These characteristics represent a valid yet incomplete picture of the economic conditions that exist at these communities. In addition to the formal economic structure and status, a vast array of less-visible economic forms of production are taking place in concert with the formal economic production. These include household and do-it-yourself activities, communal activities, and irregular or clandestine activities. Together, all of these forms of production interact with formal production systems to create a richer, more complex interpretation of the local economy than formerly suspected. This paper examines this richness and the variation in the mix of these forms of production across the Canadian economic landscape.

USING 35MM AERIAL PHOTOGRAPHS FOR ASSESSING PRAIRIE PLANT SPECIES by Robin J. Rapai, University of North Dakota, Grand Forks, ND 58202.

Seventeen prairie preserves lie on the Minnesota side of the Red River of the North's drainage basin which roughly coincides with the area once covered by glacial Lake Agassiz and borders North Dakota. The primary objective of this study was to test whether there is a relationship between variations in aerial photograph pixel brightness and total numbers of plant species in selected prairie preserves in northwest Minnesota, a region dominated by typical tallgrass prairie. Standard 35mm color aerial photographs were collected from the ASCS to measure pixel brightness variation.

Regression analyses were performed in an attempt to develop a prediction equation and account for the variability of the total number of plant species with various combinations of predictor variables. After a refined approach was undertaken, predictor variables were found to account for over 94 percent of the variability of numbers of plant species in the prairie preserves. Such information can lead to sensitive prairie preserve management as prairie functions, identification techniques, and related technologies are better understood and projected. Displayed patterns of changing vegetal species may be capable of sounding alarms to researchers and managers.

SENSIBLE HEAT FLUX AND TELECONNECTION PATTERNS IN THE NORTHERN HEMISPHERE by Marilyn Raphael, The Ohio State University, Columbus, Ohio 43210-1361.

Monthly and seasonal 700 mb temperature and geopotential height data are used to evaluate the meridional flux of eddy sensible heat associated with sea level pressure teleconnection patterns in middle latitudes of the Northern Hemisphere. These teleconnections have centers of action over the East Atlantic, Southern Europe, Scandanavia, the Bering Sea, and the North Pacific and include the North Atlantic Oscillation. The results are compared to determine the teleconnections that are associated with significant transport, in terms of direction and magnitude, of eddy sensible heat. Links between the sensible heat flux and station surface temperatures and hence, the teleconnection patterns are also explored.

ORIGINS OF SUMMER VISITORS TO MOUNT DESERT ISLAND, MAINE, 1881-1891 by Henry A. Raup, Department of Geography, Western Michigan University, Kalamazoo, MI 49008.

Mount Desert Island, Maine, was one of many summer resorts that developed in New England during the late 19th century. Contemporary local newspapers in the destination resorts provide one means to identify the permanent place-of-residence of visitors to those resorts.

During the 1881-1891 period Mount Desert Island, with its principal village of Bar Harbor, was on the ascendancy as a summer colony. The columns of the weekly *Mount Desert Herald* record the origins of hotel patrons and cottagers and suggest the relative drawing power of Mount Desert Island during the study period. Boston, New York, and Philadelphia provided the majority of summer residents due to their large sizes and to the proximity of these cities to the Maine coast. However, summer visitors also arrived from numerous other cities, such as Washington and Cincinnati.

CHANGING MAN/LAND RELATIONSHIPS IN THE CANADIAN FUR TRADES: A COMPARATIVE EXAMINATION by Arthur J. Ray, History Department, University of British Columbia, Vancouver, Canada V6T 1W5

The fur trade has had a major impact on the lives of almost all Canadian Indians at some point in their history during the post-contact era. However, the varied economic orientations and ecological settings of the Indian groups meant that the fur trade did not have the same impact on their relationships to the land or to the European intruders. I will explore this issue by taking two case examples, one from the central Subarctic and the other from the Northwest coast, and looking at the way the beaver-dominant fur trade influenced basic subsistence practices and land tenure systems. I will provide evidence which shows that it is risky to draw parallels between the fur trading experiences of Subarctic big game hunters and west coast salmon fishermen. I will highlight the practical importance of taking a comparative historical geographical approach to current land claims research by looking at issues raised in the Gitksan-Wet'suwet'en title action currently before the courts in British Columbia.

IMMIGRANTS AND HOUSING IN THE CANADIAN CITY by Brian Ray, Department of Geography, Queen's University, Kingston, Ontario. K7L 3N6

Although immigration has been a significant component of overall Canadian population growth for the last decade, its geographic impacts within Canada have been highly localized, focusing particularly on the three largest metropolitan areas - Toronto, Montreal and Vancouver. Moreover, recent immigrant flows have been predominantly from Third World countries, in part reflecting a strong emphasis on family reunification and refugee categories in federal immigration policy. These groups have different demographic and economic characteristics from earlier immigrant streams and have different experiences in and different impacts on housing markets in the receiving cities. In this paper special tabulations and the Public Use Sample from the 1986 Census are used to explore the recent housing experiences of immigrants to Canada and to compare them with both the Canadian-born and immigrants from earlier periods.

HISTORY OF DYNAMIC CLIMATOLOGY by John N. Rayner, Geography, The Ohio State University, Jay S. Hobgood, Atmospheric Sciences, The Ohio State University, and David A. Howarth, Geography, University of Louisville.

The field of dynamic climatology was identified by Tor Bergeron in the 1920's. Like many other scientific areas its content has changed as the science of the atmosphere has developed. It is the study of climate based upon its relationship to the circulation of the atmosphere: its energy processes, dynamics and thermodynamics. As such it has been viewed as the basis of long range weather forecasting and has included the statistical treatment of weather types and the analysis of teleconnections. Recent work depends very much upon computer models, in particular general circulation models. These are used to isolate the factors affecting regional climates, to reconstruct past climates, to analyse the sensitivity of the atmosphere (and climate) to changes in the boundary conditions, such as an increase in carbon dioxide, and thereby to predict future climates.

CONSUMER SHOPPING BEHAVIOUR MODELLING USING SCANNER PANEL DATA By Steven Reader, Department of Geography, McMaster University, Hamilton, Ontario, L8S 4K1 [READER@MCMASTER.CA]

The field of disaggregate consumer behaviour modelling is faced with a major revolution in terms of data collection, namely scanner panels. Using new store technology such as EPOS/EFTPOS and a consumer 'smart' card, scanner panels allow the automated collection of longitudinal purchasing information, on an individual basis, for large sample sizes. The challenge for fields such as marketing research and marketing geography is how to handle the vast amounts of spatially and temporally disaggregated data generated by scanner panels.

This paper will review the current status of scanner panel implementation in North America. Following this review, issues relating to data collection, sampling and ethics will be addressed. Finally, the challenges and opportunities facing analysts of such data will be examined. Included in this latter discussion will be an empirical example of the benefits to be gained from using longitudinal panel data as opposed to traditional cross-sectional consumer surveys. The paper will be of interest to anyone interested in retail geography, consumer behaviour modelling and longitudinal data analysis.

HINTERLAND COMMUNITIES AND SUSTAINABLE DEVELOPMENT by Maureen G. Reed, Department of Geography, University of Waterloo, Waterloo Ontario Canada, N2L 3G1.

Few resource-dependent, hinterland communities have been successful in sustaining economic viability once the primary resource base has declined. In this context, proponents of sustainable development suggest strategies to reduce the rate of resource depletion, to provide a diversity of resource activities, and to encourage small-scale experimentation of new approaches to development. Such strategies require a decision-making system which allows for local input in generating development alternatives and flexibility in policy implementation.

In northern Ontario, resource policies are generated and implemented at regional to provincial scales. The township of Ignace, Ontario, was used as a case study to examine the extent to which local interests can be incorporated into long term economic strategies in the face of a mine closure. Recent economic initiatives have focused on a diversity of small-scale activities. A co-management approach to resource use was established as a pilot project to meet the dual objectives of resource productivity and local input.

This paper examines the potential and limitations of co-management as a decision-making system for sustainable development. Preliminary results suggest that a co-management approach can provide alternatives for economic development which can be self-sustaining. However, expectations of actors who represent provincial and local interests will have to be brought in line regarding current levels of resource use, decision-making control and responsibility for outcomes.

PREFERENTIAL DISSOLUTION OF A CARBONATE AQUIFER: A KENTUCKY EXAMPLE by Philip P. Reeder, Department of Geography, University of Wisconsin-Milwaukee, Milwaukee, WI 53201.

Due to landuse changes, runoff has greatly increased in Bowling Green, Kentucky necessitating the drilling of over 600 storm water injection wells to direct runoff into the Lost River Karst Aquifer upon which the majority of the city is built. Research was conducted to (1) differentiate areas of the city as optimal for removal of storm water runoff, (2) correlate lithologic features between wells, and (3) assess the degree to which structure and lithology control void development within the aquifer. That was accomplished using maximum well capacity tests, cave exploration and the correlation of lithologic features between wells. Data pertaining to voids intersected by wells was collected using a color down-hole video camera system.

It was only possible to develop general trends in the areal distribution of voids throughout the city, hence, specific optimal areas for removal of storm water runoff could not be differentiated. The correlation of voids between wells was possible along both the regional dip and strike of the beds thus indicating lithologic and structural control. Cave exploration and mapping also indicated that lithology and structure also control cave patterns.

THE SPACE OF THE CHILD: SUPERVISED PLAYGROUNDS IN TORONTO, 1900-1930 by Wayne C. Reeves, Department of Geography, University of Toronto, Ontario M5S 1A1.

Directly influenced by the American play movement and integrating a number of urban reform strands, several non-governmental organizations advocated supervised playgrounds in Toronto in the early twentieth century. The supervised playground was viewed as an instrument to shape the physical, moral, and intellectual life of children. Social control was thus placed in an environmentalist framework. Reformers sought to establish playgrounds in "congested districts," hoping to inculcate slum children with middle-class values.

An alliance between the Toronto Playgrounds Association and Central Neighbourhood House (a social settlement) achieved its greatest success in placing playgrounds on the public agenda. As the city's Parks Department assumed control of the playgrounds their distribution became more widespread, and the crusading fervour waned. By the 1920s, playgrounds were no longer an important focus of public discussion, their provision and management having been absorbed into the civic bureaucracy.

THE END OF METHOD

D. Reichert

Department of Geography at the Swiss Federal
Institute of Technology, Zürich, Winterthurerstr.
190, CH-8057 Switzerland

A story about dialogue.
An idea of Geography as Ethics.
Speculations on the heartbeat of knowledge.
An inquiry into Philosophical Hermeneutics, its
conception of "method" and their applicability to
Human Geography.
Maybe something about a dog with three legs
and a limping tiger-man.
Certainly "totality for specificity's sake".
A map of the limits of Geography.
And the end of communication.

JAPANESE DIRECT INVESTMENT IN THE UNITED STATES' MANUFACTURING SECTOR by Neil Reid, Department of Geography, Arizona State University, Tempe, Arizona 85287.

Japanese direct investment in the United States manufacturing sector is primarily a post-1970 phenomenon. Today over 180,000 Americans are employed by 945 US-based Japanese manufacturing plants. During the 1970s the majority of Japanese manufacturing investment (measured in terms of employment) was located in the western and southwestern US. Three states dominated this early investment - California, Alaska, and Texas. In addition to being geographically concentrated, Japanese manufacturing investment was also sectorally concentrated. Three manufacturing sub-sectors dominated early Japanese investment - electronic equipment, food products, and industrial machinery. In the 1980s the share of Japanese investment that went into the former two of these sub-sectors dropped substantially. Instead, Japanese capital has become increasingly directed towards the primary metals and transportation sub-sectors. This changing sectoral pattern has had distinct geographical ramifications. Increasing investment in primary metals and transportation equipment has resulted in a geographic 'decentralisation' of Japanese investment, away from the western and southwestern United States towards a handful of midwestern and upper southern states - Indiana, Illinois, Kentucky, Michigan, Ohio, and Tennessee.

COMMUNITIES AND PLANNING IN APPALACHIA: THE APPLICATION OF THEORETICAL FRAMEWORK BY Robert E. Reiman, Department of Geography and Planning, Appalachian State University, Boone, NC 28608.

It is a well-established fact that people in marginal areas usually live in rural settings, or in rural settings where some support systems are available from peripheral urban nodes. It is also understood that these people have a deep distrust of many governmental policies, mainly because they do not believe that those policies fit them very well. Therefore, planning has, for these areas, often been highly unsuccessful in terms of superimposition of development policies of higher governmental agencies (sometimes known as "top-down" planning).

A method more satisfactory, to both rural residents and local government officials, appears in the "bottom-up" process,wherein the people who live in the affected areas play a much larger role in the devolopment of policies for the region in which they live.

The purpose of this paper is to explore the relationship between current planning theory and existing planning practice, especially as it pertains to rural areas and specifically to the Appalachian Region of the U.S. An examination and explanation will be made of the five currently accepted major planning theories: synoptic, incremental, transactive, advocacy and radical planning. Following that we will examine the "fit" of these theories as they may pertain to both top-down and bottom-up planning methodology and technique.

CHERNOBYL'S RADIATION AND WESTERN EUROPE'S RESPONSE by Pauline Reimers, University of South Carolina, Columbia, South Carolina 29208.

In April, 1986, one of the four reactors at the Chernobyl nuclear power plant in the Soviet Ukraine exploded. The accident resulted in the world's greatest one-time release of radioactivity. In the following days and weeks, the radiation defied all models of distribution and eventually covered all of Europe. Weather conditions combined with the complexities of radiation to ensure that distance from the source was no guarantee of protection from Chernobyl's contamination. Deposition of fall-out was uneven throughout Europe, as also was the reaction of governments.

As the European Community approaches 1992 and a united Europe, the assumption is that the trend toward unification would be evident. Accordingly, therefore, a cohesive and integrated response to Chernobyl's radiation was to be expected. Western Europe's reaction to the radioactive fall-out offers an excellent opportunity to look at how the EC, and individual European states, coped with a serious case of transboundary pollution. Chernobyl's radiation provided the new Europe with one of the first major tests of its cooperative strength.

GEOGRAPHIC CONSTRAINTS UPON THE ROMANIZATION PROCESS IN THE FRENCH PYRENEES by K. Reiter, Department of History, University of Arizona, Tucson, Arizona 85721

Traditionally, historians have considered romanization to be a relatively consistent process from place to place within the Roman Empire regardless of local geography or culture. In recent years, however, there has been lively debate over new evidence suggesting possible regional variants in romanization, as well as the degree to which these variants may have been conscious Roman policy. This paper uses archaeological, literary, and epigraphical evidence to examine the process of romanization which occurred in the western French Pyrenees during the period 100 B.C. - A.D. 100, with emphasis on the constraints imposed upon the romanization process by environmental conditions. The rugged terrain and climate were most suited to semi-nomadic lifestyles, which precluded the early formation of civic centers as existed elsewhere in southwestern France. While pre-existing civic centers outside of the Pyrenees were loci of congregation and cultural adaptation, no such centers existed in the Pyrenees. The formation of these centers and attempts to make them attractive congregation points for the local semi-nomadic population were an important part of the Pyrenean romanization process. The montane environment limited early Roman influence on the Pyrenean population beyond these new centers. While studies of mountainous regions elsewhere in the Roman empire will be needed to generate a more comprehensive view of Roman policy, the evidence from this region does not rule out the possibility that there was a conscious policy or romanization which took the montane conditions and semi-nomadic cultures of the Pyrenees into account.

NORTHERN TOGO AND THE WORLD

by Leo de Haan & Henk Reitsma, Department of Human Geography, University of Amsterdam, Jodenbreestraat 23, 1011 NH Amsterdam, Netherlands.

The purpose of this paper is to discover whether a remote and backward region in a low-income African country is integrated in the world-economy, how this integration has come about and how it has changed over time. Historical records and more recent literature on trade and labor migration were studied, and fieldwork was carried out in the savanna region of northernmost Togo.

Prior to 1900, outside contacts were limited to occasional exchanges of goods made possible by long-distance caravan trade between Ashanti (Ghana) and Hausaland (Nigeria) passing through the area. German penetration into northern Togo after 1900 resulted in slightly improved accessibility and minor attempts at production for export. The period 1914-45 witnessed further infrastructural improvements, forced introduction of peanut and cotton production, and some labor migration to the Gold Coast. These trends accelerated after 1945, allowing Togo's savanna region to assume a modest role in the world-economy.

Today, growing population pressure is straining the scarce natural resources. Food and fuelwood shortages already threaten mere survival. Further integration into the world-system, including development assistance provided by industrial market economies, may well be necessary to arrest future environmental degradation and human deprivation.

THE INFLUENCE OF URBAN CONTEXTS ON ETHNIC ENTERPRISES IN THE NETHERLANDS,

by Ans M. Bekers. Faculty of Geographical Sciences, University of Utrecht, P.O. box 80.115, 3508 TC Utrecht, The Netherlands

Ethnic enterprises, their beginning, rise and fall, have been the focus of research for some time. Cultural characteristics of the ethnic entrepeneurs and institutional factors are often mentioned to explain this phenomenon. Thusfar, the influence of the urban context has received little attention. For that reason a research project has started to examine the role of different urban contexts on ethnic enterprises. The influence of the urban context on ethnic enterprises in the Netherlands will be uncovered through research conducted in two different cities, namely Amsterdam and Rotterdam. The former represents a more high technology industry and service based urban environment, with a mixture of low and high levels of incomes and skills. The latter represents a more traditional industrial city, with low and middle levels of incomes and skills. In these cities one ethnic group, the Turkish population, is scrutinized.

This paper concerns the first results of the research: an overview of literature concerning the role of urban contexts on ethnic enterprises in general and a comparison of the urban context of the selected cities. In this comparison attention will be given to the labour market, the population and the service structure of both cities, as well as the place of the Turkish population in these urban contexts.

DRUG SALES AREAS AS ANCHOR POINTS OF THE SPATIAL SEARCH OF RESIDENTIAL BURGLARS

by George F. Rengert, Temple University, Philadelphia, PA 19122 and Arlene C. Rengert, West Chester University, West Chester, PA 19383.

The spatial search of residential burglars has much in common with that of home buyers and renters searching for a new home. Both are oriented toward areas which they use on a daily basis. While home buyers and renters are oriented toward work places, residential burglars who are drug dependent are oriented toward drug sales areas. Models developed for analysis of real estate search are applied to burglary search including the bimodal and teardrop models. The findings are extrapolated to illustrate how property crime may act as the vanguard for the spatial spread of drug sales through urban communities.

TIME FOR CRIME: THE IMPACT OF WORK ON THE TIME USE OF RESIDENTIAL BURGLARS

by George F. Rengert, Temple University, Philadelphia, PA 19122

Burglaries are not simple events that take place only in space. Time is just as important as spatial accessibility in defining opportunities for crime. Burglaries require that the burglars' schedule and that of the victim coincide to leave the home vulnerable, and that the burglars' spatial search lead to that site at that time. Data in half hour time blocks were collected from residential burglars in Philadelphia to illustrate how capability constraints' associated with work schedules and time use of victims make it difficult for an active burglar to remain employed. Changes in time use allowed by residential burglary illustrates graphically how time use is an indicator of routine changes in the criminals' lives. These changes can provide important indicators for corrections professionals such as probation and parole officers. The potential for "intensive supervision" to be used successfully is discussed due to the ability to monitor and change time use patterns.

TREKKING IN NEPAL: IMPACT ON THE KHUMBU AND KANGCHENJUNGA AREAS

by William C. Rense, Shippensburg University, Shippensburg, PA 17257.

The impact of international tourism on third world countries is now recognized as being far-reaching and profound. Tourism in Nepal has grown some 20-fold over the past 25 years with significant socio-economic influence. The growth of adventure travel (trekking) has been especially important since there is a direct impact in the rural areas of the country. This paper compares the impact of trekking on the Khumbu and Kangchenjunga regions. Trekking is well developed in the Khumbu with 10,000 visitors per year whereas the Mt. Kangchenjunga area was only opened to trekkers in May, 1988. In the Khumbu, with Sagarmatha National Park and Mt. Everest, the local economy now revolves around tourism while the Kangchenjunga region still has a traditional economic system. There are, thus, major differences between the two regions as reflected in both the socio-economic and environmental spheres. Much as the airstrip at Lukla played a major role in developing the tourist industry of the Khumbu, a new roadway into the Kangchenjunga region should also serve to greatly stimulate adventure travel. Future changes in the Kangchenjunga region can be anticipated based upon the Khumbu experience.

SPATIAL ECONOMETRIC ANALYSIS OF PANEL DATA

by Luc Anselin and Serge Rey, Department of Geography, University of California, Santa Barbara, California 93106.

In many instances in regional econometric modeling, insufficient observations are available over time, so that models need to be estimated by means of panel data, i.e., pooled cross-sections and time series. Typically this is carried out using Seemingly Unrelated Regressions (SUR) or Error Component Models (ECM). Standard econometric practice is based on the assumption that cross-sectional observations are independent. However, while this is by and large appropriate when the observational units are randomly selected individuals or other economic agents, this assumption is often violated when data are obtained for aggregate spatial units, such as contiguous counties, states or provinces. The latter is the rule rather than the exception in empirical economic geography.

In this paper, we analyze the effect of spatial dependence on various techniques for pooling time series and cross section data. A number of adjustments to standard methods are outlined and illustrated for a multiregional labor market model of California.

THE RESTRUCTURING OF SOCIAL RELATIONS IN THE COUNTRYSIDE: THE SCHOOL CONSOLIDATION MOVEMENT IN IOWA, 1895-1925 by David R. Reynolds, The University of Iowa, Iowa City, Iowa 52242.

In 1895 the control of education in rural areas in Iowa remained firmly within the control of farm communities. By 1920, after two decades of unprecedented prosperity in agriculture, the state's educational apparatus in its modern form was largely in place; social reproduction had become a social "function" of the state almost as much in Iowa as it had in the more industrial states of the Union. The movement to consolidate rural schools had been the centerpiece of this social and political transformation. Billed as the solution to the "rural school problem," consolidation was resisted to varying degrees throughout the state and this resistance possessed a distinctive social geography. The paper attempts to clarify the nature of the struggles involved in the movement by relating them to local social and economic conditions and to the broader changes in the nature of production/reproduction characterizing this period in U.S. social history. Linkages of the Iowa consolidation movement to the Country Life Movement--a national, elite-led movement to improve rural social life and enhance agricultural production--are also explored. The interpretation which emerges challenges the conventional view that school consolidation as implemented was a rational, progressive response to rural social and economic conditions existing in Iowa at the time.

SEDIMENT TRANSPORT ACROSS A PACIFIC FRINGING REEF by William J. Reynolds, Department of Geography, U.S. Military Academy, West Point, New York 10996-1695.

In 1980, portions of the fringing reef flat protecting the village of Tafunsak, Federated States of Micronesia, were dredged to provide fill material for an airport runway access road. Subsequent to the dredging, Tafunsak experienced severe erosion immediately onshore of the dredge pits. This erosion has resulted in the village landowners filing a damage suit against the Government of the State of Kosrae and the Government of the United States of America, sponsors of the airfield project.

Field investigations were made to determine the nature of the shore processes, the possible impact of the dredge pits as a cause of beach erosion, and to recommend mitigation measures for the shoreline region experiencing erosion. It was found that, while shoreline erosion was common around the entire island, it was particularly severe onshore of the dredge pits. It was also found that the pits were being filled with sediment moving from the reef toward the shore, giving clear evidence that the Tafunsak beaches were being deprived of natural nourishment across the reef face.

Mitigation measures investigated included construction of a rock revetment, beach nourishment, and relocation of cultural features inland. The most promising options were designed and cost estimates performed. Present land use practices were taken into consideration in making a recommended plan-of-action.

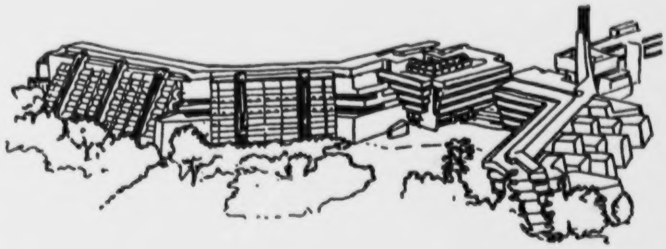
IMPACT OF CHANNELIZATION ON THE FLUVIAL DYNAMICS OF A DRYLAND RIVER by Bruce L. Rhoads, University of Illinois, Urbana, IL 61801.

This study investigates the impact of channelization on the morphology, energy conditions, and sediment transport efficiency of Santa Rosa Wash - an ephemeral river in south-central Arizona. Historical evidence and field data indicate that prior to channelization the wash consisted of a main channel flanked by a broad floodplain containing numerous anabranching channels. During the early 1960s the wash was replaced by a trapezoidal flood-control channel. Hydraulic simulations show that channelization produced a five-fold increase in average energy conditions and a three-fold increase in average sediment transport efficiency. By 1988 enchannel erosion associated with these changes increased channel capacity by 18% and decreased total fall of the channel bed over the 14.8 km reach by 2.8 meters. Despite these morphologic responses, little change occurred in average energy conditions and sediment transport efficiency, suggesting that adjustment to channelization is incomplete and this fluvial system will continue to be unstable in the near future. Results also indicate that maintenance activities to enhance flood control effectiveness delay the fluvial adjustment process.

IS SUSTAINABLE DEVELOPMENT POSSIBLE? URBANIZATION AND THE POLITICAL ECONOMY OF AFRICA'S RURAL DECLINE by Jesse Ribot, Energy and Resources Group, Univ. of California, Berkeley, CA 94720.

Rapid Third World urbanization is a primary force of rural environmental degradation. Although growing urban populations consume a disproportionate share of rural resources they bear little of the environmental costs of their consumption. Effective programs of sustainable development must eventually redress this imbalance between urban use and rural abuse. To do so, however, may entail limiting the access of urban populations to rural resources and instituting policies that would raise the cost of rural products to urban consumers. Either action runs counter to a reality of political life in the Third World: Political and economic power is concentrated in urban centers, and politically sustainable programs are those that principally serve to maintain or intensify urban access to cheap rural resources.

Against this backdrop, how might programs of sustainable development fare that seek to halt this urban-driven degradation of rural resources? This paper considers this question via inspection of the dynamics of Africa's urban woodfuel markets. Citing recent fieldwork, the paper indicates that urban woodfuel demand throughout Africa is growing, with detrimental effects on rural ecosystems whose vitality is crucial to long-term economic growth. It shows that viable technical solutions are lacking and suggests--for reasons inherent in the political economy of Africa--that urban policymakers are persistently less concerned with rural environmental demise than with insuring uninterrupted supply of fuelwood to urban users. It concludes that State intervention in rural-urban resource markets is a necessary but politically costly--and perhaps unattainable--strategy for reversing existing patterns of rural environmental degradation.



GIS DETERMINATION OF AGRICULTURAL LAND PRODUCTION POTENTIAL AND PROPERTY VALUES by Keith Rice and Donald Last, University of Wisconsin-Stevens Point, Stevens Point, Wisconsin 54481.

Agricultural valuation is often based on crop production and soil survey capability ratings. Yet, due to the lack of crop yield data, and complex interrelationships of soil attributes, this type of assessment often proves inadequate. As an alternative, many midwestern states use soil Productivity Index (PI) systems for land valuation. PI's attempt to equate the inherent production capacity of various soils to the values of agricultural land, and are generally accepted as being an excellent indicator of the worth of agricultural land. The calculations, however, are often laborious and multifarious. This paper depicts a GIS procedure that was formulated and tested for efficiently calculating PI ratings. A rural database was created encompassing a 45 square mile region of Portage County, Wisconsin. The database was created from both manually and scanned digitized analog maps, that included soil polygons, land ownership parcels, and land use/land cover. The PI formula variables included: available water capacity, organic matter content, permeability, pH, water table depth, erosion potential, bedrock depth, and percent slope. Tabular and graphic information were integrated together within a pc-based GIS to produce productivity and tax assessment values for each agricultural parcel within the study area. Results illustrate a superior land valuation methodology to the current tax assessment procedure that is dependent on crop yield data.

THE REBIRTH OF SHORT LINE RAILROADS IN THE UNITED STATES by Curtis W. Richards, University of Wisconsin-Parkside, Kenosha, Wisconsin 53141, and Michael Thaller, Carroll College, Waukesha, Wisconsin 53186.

The rapid growth in the number and mileage operated by short line railroads is one of the most significant developments in recent American railroading. These small railroads preserve service on many lightly used rail lines no longer economically operably by Class I railroads. These new railroads are one of three types based on spatial and organizational characteristics.

One type of short line railroad is organized around the core of a failed railroad. The corporate failure and abandonment of the Rutland Railroad in the early 1960's gave birth to several of the modern short line era's first carriers (with state support).

A second type of railroad operates over portions of formerly bankrupt eastern and midwestern lines not incorporated into Conrail in 1976. Additional lines were added to this category in 1981-86 as Conrail went through a second rationalization process and a new generation of Conrail "spinoffs" were born.

The third type of line is of recent origin. In this case Class I railroad started to sell packages or "clusters" of several rather than just one branch line, to prospective short line operators. Within the last year a modification of this pattern involves leasing rather than selling lines, thereby saving prospective short line operators large capital outlays needed to purchase lines. Inherent in all of these spinoffs are substantial reductions in labor costs.

DIRECT MARKETING FRUIT AND VEGETABLES IN CONNECTICUT by Timothy J. Rickard and Peggy K. Parry, Central Connecticut State University, New Britain, CT 06050.

Marketing products directly to the consumer is one of the most powerful strategies farmers have in urban fringe areas. In Connecticut, rapid urbanization has consumed much farmland but offers farmers an opportunity to address the needs of urban and suburban consumers. In a state where traditional agricultural sectors such as dairying and tobacco production have declined, direct marketing is viewed by farmers and state agencies as one means of sustaining agriculture. The State supports direct marketing of berries, tree fruits and vegetables with a lively "Connecticut Grown" promotional campaign and the identification of potential market niches.

Direct marketing is highly entrepreneurial as farmers experiment with products, volume and types of direct marketing -- pick-your-own, farm retail outlet, or farmer market. Analysis of direct marketing directories and a survey of farmers directly marketing fruit and vegetables reveal considerable diversity of farm enterprises. Small farms often specialize: berries by pick-your-own and vegetable via roadside stand. As farm size increases, however, so does both the variety of products grown and the number of modes of marketing.

Spatially, direct marketing outlets are found in every part of the state but the greatest concentrations occur where there are both large numbers of potential consumers and a tradition of fruit growing. Thus there is an absence of fruit and vegetable outlets in south western Connecticut where potential consumers on the urban fringe of New York City represent an apparent opportunity for farmer entrepreneurs. Elsewhere, adjustment to meet consumer demand is continual.

THE STRUCTURE OF NON-AGRICULTURAL COASTAL ADAPTATION: A CASE FROM THE TEXAS GULF COAST by Robert A. Ricklis, Department of Geography, The University of Texas at Austin, Austin Texas 78712.

A recently completed program of research has delineated the spatial and seasonal patterns of protohistoric aboriginal adaptation on the Texas Coast. A combination of archaeological fieldwork and delineation of the spatial and seasonal availabilities of key biotic resources has demonstrated that the non-agricultural peoples of the region adpated to the broad coastal ecotone through a seasonally oscillating settlement/subsistence pattern. While the high biomass of the coast had a gravitational affect on human settlement, relatively large human groups focused on the exploitation of the rich marine environment only during the fall and winter seasons. In the spring and summer, settlement was dispersed, with smaller groups moving slightly inland along river courses to subsist primarily on terrestrial plant and animal resources.

The data suggest that this adpative pattern had emerged by the mid-Holocene, and that little fundamental change occured over the several millennia prior to historic European contact. Prehistoric peoples maintained the basic structure of the adpative system by tracking the sequence of changes in the configuration of the coastline resulting from Holocene sea level rise.

V-I-S MODELING OF URBAN ECOSYSTEMS: A PRELIMINARY ASSESSMENT by Merrill K. Ridd and James Jiun-Ming Chung, University of Utah, Salt Lake City, UT 84112.

Urban environments are composed of highly contrasting biophysical materials. A vegetation-impervious surface-soil (V-I-S) model of urban cover composition is introduced as a tool for distinguishing ecological variability across the urban/periurban landscape. The model is based on the assumption that variation in these three contrasting cover components has significant influence on the patterns or energy and moisture flux, as well as on the visual morphology of the urban complex.

A case study in Salt Lake City demonstrates the separability of spectral classes into the three cover categories using SPOT data. The procedure involves a precise registration of the satellite data to ground control points based on (a) surveying monuments of known State Plane Coordinates, and (b) large scale (~1:4600) color infrared photography.

Using an unsupervised classification of 60 signatures, a transparent overlay is locally registered to each photo, with a 0.3 RMS error. A total of 3104 points (776 pixels) are sampled by cover type. Except for water pixels (rare occurrences) all spectral signatures are categorized by V-I-S percentages, totaling 100%. A band 2 (red)-band 3(NIR) scatter plot displays the V-I-S percentage per signature.

The results indicate that: (a) the oft-called *soil line* is better termed the *non-vegetation* line, as it more commonly represents impervious surface than soil, (b) the greenness (V) percentages progress consistently from 0% at all points along that line to the green point at 100%, and (c) urban cover composition can be quantified in terms of the three V-I-S variables using SPOT data.

The Global Village means the African World 'falls apart' again: Geographical impact of stuctural adjustment by Barry Riddell, Queen's University, Kingston, Ontario K7L 3N6.

Colonial contact meant positive change for some; however, for most 'things fell apart'. After the false hope of independence, a new form of colonialism is now occurring due to the debt crisis. The IMF has been heavily involved in lending; however, the impact of the imposed conditionalities extend beyond currency devaluation, openness, government involvement, and economic efficiency to the lives of people and the nature of African societies and economies - geography is being reshaped as the 4 Horsemen of the Apocalypse ride again.

In this presentation, the effects of structural adjustment programmes on urban-rural balances, poverty, disparities, the environment, the future of the state, the nature of underdevelopment, and differentiation within the continent are considered. It is illustrated that much difficulty results from a failure of the international economy to understand Africa - its exchange sytems, the state, the peasant, the informal economy, and meaningful Third World development.

CAN SOCIETIES ADAPT TO GLOBAL WARMING? William E. Riebsame, University of Colorado, Boulder, CO 80309.

The nature of the global warming threat (e.g., it is anthropogenic, uncertain, cumulative and in the future) is such that it invokes attention to the relative merits of "adaptation" and "prevention" policies, and, indeed, analysts are divided between those who believe that societies can adapt and those who believe that prevention (through reduced greenhouse gas emissions) is the only prudent strategy. While analyses of preventive strategies can follow well-trod lines of engineering and cost-benefit studies, assessments of social adaptability are less well developed. Adaptation, a concept borrowed from biology, has been used to explain how social systems for managing natural resources, and responding to environmental threats, emerged and are maintained. Yet, parameters of resiliency, homeostasis, absorptive capacity, and adjustment are fuzzy and of little predictive value with regard to large-scale, future environmental changes. This paper reviews concepts of adaptation in nature and society research, and suggests ways in that they can be integrated to illuminate broad social adaptability in the face of climate change.

EMIGRANT AND LIVESTOCK MORTALITY ON THE OREGON AND CALIFORNIA TRAILS by R. L. Rieck, Department of Geography, Western Illinois Geography, Macomb, Illinois, 61455.

Estimates of the number of emigrants who died on the Oregon and California trails between 1840 and 1860 range from 12,000 to 45,000. Relatively little is known about the geography of those overland deaths. Examination of more than 400 diaries and secondary sources provides the names of over 2500 individuals known to have died west of the Missouri River and yields considerable insight on the distribution of trail deaths. The most common causes of fatalities are (in rank order) cholera (and related diseases), Indians, starvation and/or freezing, and drowning.

No estimates are available for livestock mortality during the twenty-year period but it was extremely high. An 1850 diarist noted 9771 horse, ox, and mule carcasses on Nevada's Carson Desert alone. Overwork, insufficient or improper feed and water, accident, and slaughtering by Indians and emigrants are the common reasons for livestock death cited in diaries.

More than two-thirds of the emigrants succumbed east of the half-way point at South Pass in west-central Wyoming. Very limited quantitative data (supported by numerous qualitative diary observations) reveals that nearly five/sixths of the animals died west of South Pass. Therefore, because they were responding to considerably different environmental factors, a nearly inverse relationship holds between the locations of human and animal deaths.

THE REGIONAL DYNAMICS OF CANADIAN MANUFACTURING, 1961-1984 by D.L. Rigby, Department of Geography, University of California, Los Angeles, CA 90024.

A new data set is presented that details the history of Canadian manufacturing between 1961 and 1984. The data set is novel; providing information disaggregated by all twenty two-digit SIC industries and by six regions within Canada.

The paper examines the performance of Canadian industry from 1961 to 1984. While aggregate manufacturing profitability declined by some 30% over this period, significant sectoral and regional disparities were observed. Shift-share analysis of profit rate data reveals that little of these disparities are explained by industry-mix arguments. The impact of spatial variations in commodity prices and techniques of production on the rate of profit are separated. Input and output price variations are shown to exert a substantial influence on regional manufacturing profitability.

THE TERRITORY AND ENVIRONMENT OF SAN MIGUEL TULANCINGO, COIXTLAHUACA, MEXICO by Carlos Rincón-Mautner, Dept. of Geography, Austin, Texas 78712-1098

Early colonial pictographic manuscripts from Mexico are often analyzed without an adequate geographic or ethnohistorical context. Scholars have traditionally studied this corpus of manuscripts seeking a historical/genealogical correspondence with the information depicted on surviving pre-Hispanic documents from the Central Mexican Highlands. The "lienzos" from the Coixtlahuaca valley of Oaxaca comprise a group of manuscripts that remain largely unstudied. Two pictographic manuscripts from the village of San Miguel Tulancingo are described. Their contents, related to territory and environment, are analyzed and compared to information derived from each other, from additional archival sources, and to field reconnaissance of present day existing boundaries and conditions. When used with additional sources, the analysis of these pictographic documents, with a similar provenance but made at different times (early 17th and 18th centuries), provides new insights on the purpose and value of these early cloth paintings. They acquire a different historical dimension in the assessment of territorial changes between communities. Furthermore, they provide information on the location's microenvironment from which a better understanding of its desirability as a place for permanent settlement can be discerned.

CATHOLIC PILGRIMAGE CENTERS IN QUEBEC, CANADA by Gisbert Rinschede, Katholische Universität Eichstätt, D-8078 Eichstätt, F. R. of Germany

This paper deals with geographical aspects of Catholic pilgrimage centers in Québec. There are about three important places all situated along the St.-Lawrence-River (St.-Joseph-Oratoire, Notre-Dame-du-Cap and Ste.-Anne-de-Beaupré) and about 10 medium-sized places. They are altogether visited by 3 - 4 million pilgrims every year. Pilgrims to the important shrines with up to a million and more pilgrims per year come from all Canadian provinces and from the northeastern and midwestern United States. The smaller shrines only have a regional catchment area out of the province in Québec.

The stream of pilgrims is characterized by a strong seasonality because due to climatic conditions the shrines are in general only open from the end of April to early October. The social group of pilgrims, from selected examples, will be also presented according to number, type, origin, ethnicity, social structure, and motivation.

The different places will be examined with regard to its religious history, size, topographical and orographical situation, structure, kind of facilities and spatial relationships to its environment.

The activity space of pilgrims and pilgrim tourists coming from different parts of Québec, other Canadian provinces and the United States will be analysed.

TRENDS IN PALAEOECOLOGY AND THE ROLE OF BIOGEOGRAPHY by J. C. Ritchie, University of Toronto, Scarborough College, 1265 Military Trail, Scarborough, Ontario M1C 1A4.

Three rapidly moving technologies - high speed computers, remote sensing, and molecular biology - are far outstripping our ability to adapt the structure and style of natural science to the scope they offer. Palaeoecology, with its strong links to the universal science, geography, will merit attention through the turn of the century only if it learns to deal adequately with the new tools. Real data and analyses from arid regions are used to illustrate these current and future needs and imperatives - institutional realignment and flexibility to vastly improve the efficiency with which large data sets are exploited, technical skills tapped, and non-trivial ideas generated; computer experiments at global and system scales to force new concepts beyond individual capacities; and a greatly accelerated growth of understanding of autoecology.

WET ACID DEPOSITION AT TWO MOUNTAIN SITES IN THE COLORADO FRONT RANGE, Michael E. Ritter, University of Wisconsin-Stevens Point, Stevens Point, Wisconsin 54481

This paper examines the elevational change of wet deposition near Niwot Ridge, Colorado. Sulfate and nitrate concentration and deposition at two sites, 9,000 ft and 11,500 ft, are related to synoptic weather conditions and site factors.
Wet deposition data were provided by the National Acid Deposition Program for 1987 and 1988. Surface and 500 mb synoptic data were obtained from NWS Daily Weather Maps, supplemented with data gathered at the sites.
The results showed a statistically significant decrease in average nitrate and sulfate concentration and deposition by rainfall with increasing elevation. The lower site received larger rates of deposition than the higher site during the passage of troughs or fronts in conjunction with a surface high and a 500 mb ridge to the west of the sites. The higher site experienced larger deposition rates during westerly flow without the presence of the 500 mb high pressure ridge.
A statistical difference in nitrate deposition, but not sulfate deposition or sulfate and nitrate concentration by snowfall, between the two sites was found. High deposition periods occurred with frontal passages or, when upper air flow was southwesterly without presence of surface fronts or troughs. When upper air flow remains westerly to northwesterly the higher site receives more snowfall and thus its rate of nitrate deposition approaches that of the lower site.

DEFINING PHYSICAL GEOGRAPHY: AN ACADEMIC NECESSITY

by V. L. Rivizzigno, Dept. of Geography, University of South Alabama, Mobile, AL 36688.

After chairing a task force charged with revamping USA's General Education curriculum, I have come to the conclusion that the definition of an academic discipline is most important as it can serve as the primary means of classifying the discipline within a General Education curriculum. Dictionary and introductory textbook definitions were used to justify the inclusion or exclusion of disciplines within the curriculum categories of social sciences, physical sciences, humanities, fine art, and communication. Many dictionaries and introductory geography textbooks made my goal of getting our physical geography courses classified as physical sciences difficult because of the inconsistencies in the definition of physical geography. There was also the problem that many of the definitions did not mention that physical geography was a physical science. The AAG needs to develop a standard definition of physical geography, which includes the identification of major subfields, and the idea that physical geography is a physical science. Once this is done, the AAG should disseminate the definition to publishers and granting agencies.

LABOR FORCE SEGMENTATION AND THE INTRA URBAN LOCATION OF INFORMAL SECTOR ACTIVITY IN SALVADOR, BRAZIL

by R. Roberge, Department of Geography, University of Ottawa, Ottawa, Ontario, Canada K1N 6N5.

The productive organization of a Salvador, Brazil is examined to determine how informal sector activity is related to other income producing activities. The spatial distribution of informal sector activity for the urban core and periphery are analysed and related to patterns of migration.

URBAN POPULATION ESTIMATES USING TEXTURAL ANALYSIS

by Charles Roberts and Robert Crane, Department of Geography, The Pennsylvania State University, University Park, Pa, 16802

The last few decades have been a period of rapid and frequent metropolitan change. The United Nation estimates that over half of the world's population live in urban regions. The last twenty years in the United States have seen the rapid growth of both metropolitan and nonmetropolitan regions. There is a need to develope a technique to frequently monitor metropolitan growth for both developed and underdeveloped nations.

The development of a new generation of satellite sensors may potentially fill this need. The improved SPOT and Thematic Mapper sensor resolutions allow more detailed studies of urban areas, but most existing classification schemes for digital satellite data are based on spectral reflectance values of individual pixels, rather than the spatial arrangement of reflectance features.

This paper reports ongoing work on the development of a textural classification technique for urban areas in the United States using Landsat Thematic Mapper data. This classifier discriminates between neighborhoods on the basis of spatial variability of reflectance patterns. The classifier was applied to the urban region around McAllen, Texas. A series of classes representing different residential neighborhoods with different housing densities were used, and multipliers applied to estimate the population of the textural regions. The results were compared to block level census data.

THE EVOLUTION OF THE WANDERING GRAVEL-BED FLOODPLAIN OF THE LOWER FRASER RIVER, BRITISH COLUMBIA

by Michael C. Roberts, Dept of Geography, Simon Fraser University, Burnaby, B.C., Canada, V5A 1S6.

The Fraser River drains a basin of $232\ 000\ km^2$ and flows into an estuary of the Pacific Ocean - the Strait of Georgia. The river has a snowmelt freshet (mean annual flood at Hope is $8\ 790\ m^3s^{-1}$) peaking in the June-July of each year. The reach of the river between Agassiz and Chilliwack has a wandering gravel-bed style of fluvial sedimentation: one or more sinuous channels, forested islands, gravel bars and seasonal side channels in the active channel zone. The sediments of the floodplain are dominated by three lithofacies: a basal cobble gravel, an horizontally bedded sand and an upper fine sand and silt.

A major geomorphic element in the active channel zone are the forested islands which represent zones of sediment stability. The islands are crossed by shallow chutes that only have flows during peak discharges. Separating the island from the floodplain is usually a major chute which flows for 4 or 5 months of the hydrologic year. The floodplain forms by the lateral accretion of a forested island when sedimentation of the head of the main chute causes an avulsion. Mapping of the floodplain reveals that cross-island chutes and the main chute are usually preserved producing a distinctive ridge and swale topography.

GROUNDWATER MANAGEMENT INSTITUTIONS IN THE SOUTHERN OGALLALA AQUIFER: EFFECTS ON IRRIGATED LAND USE

by Rebecca S. Roberts, University of Iowa, Iowa City, Iowa 52242, and Jacque Emel, Clark University, Worcester, Massachusetts 01610.

One of the sharpest groundwater policy questions concerns the performance of common-property institutions relative to strict regulation of property rights. Nowhere is this distinction more striking than along the Texas-New Mexico border overlying the rapidly depleting Southern Ogallala aquifer. Texas relies on common-property institutions; New Mexico strictly regulates groundwater withdrawals. Existing theory of common pool resources suggests that common property institutions result in excessive depletion rates and dissipation of economic surplus. Although economic/hydrologic models demonstrate efficiency benefits to regulation, actual empirical assessment is almost nonexistent.

An analysis of irrigated land use along 14 transects in the Southern High Plains of Texas and Mexico found no differences in land use attributable to groundwater management or to other institutional differences between states. Instead, differences in soils along a limited segment of the state border account for most of the differences in land use commonly attributed to the alternative resource management strategies of the two states. The absence of the anticipated management effects suggests relationships between family-farm enterprises, groundwater use, and groundwater management need to be retheorized before conceptual models can be productively employed to analyze policy.

GOING OFFSHORE: FINANCE AND DEVELOPMENT IN THE CARIBBEAN

by Susan Roberts, Syracuse University, Syracuse, New York 13244.

Certain islands of the Caribbean are not merely surviving turbulent times of global restructuring, but appear to be prospering from the inherent uncertainty and instability. Islands such as the Bahamas and the Caymans have each competed as bases for offshore financial services, deliberately promoting themselves as host to a range of more or less "peekaboo" financial arrangements. Open and flexible engagement with international banking, the multinational business of tax avoidance and evasion, flight capital, and money laundering, is central to the functioning of offshore financial centers. Such places can profit from, but are also vulnerable to, the vagaries of the world economy, especially shifts in the global topography of regulation.

The case of the Cayman Islands is examined in its historical context, and the nature of the "development" engendered by its offshore status is explored. Attempts by other Caribbean islands to emulate the established offshore financial centers are reviewed and their prospects considered. The notion that the established offshore financial centers in the Caribbean offer templates for development elsewhere in the region is called into question.

THE DEVELOPMENT OF CARTOGRAPHY AT WISCONSIN

by Arthur H. Robinson, Department of Geography, University of Wisconsin, Madison, WI. 53706.

Instruction in cartography was minimal at Wisconsin prior to 1946, consisting of one one-semester course. Prior to WW II one became a "cartographer" by in-house training and experience in governmental agencies or commercial establishments.

Wartime experience demonstrated that academic instruction was needed. The Geography Department responded by initiating a program of instruction as well as providing a "cartographic service" to the university community. The program was greatly enhanced by the inclusion of cartography as one of the subjects promoted by generous awards to graduate students in the program authorized by the National Defense Education Act (NDEA). The department's "cartographic service" grew to a full-fledged, well-equipped Cartographic Laboratory. In the 70's the Department of Geography was authorized to offer curricula leading to Bachelor and Master of Science/Arts degrees in Cartography. Specialization in cartography for the Ph.D. began in the early 1950's.

SNOW TRENDS IN THE CENTRAL UNITED STATES by David A. Robinson, Department of Geography, Rutgers University, New Brunswick, NJ 08903.

The past 40 years of winter (D-F) snow cover in the Central United States has, on average, exceeded that of the first half of the century. This upward trend is most noticeable in a zone running through the middle of the region. The first half of the century exhibited some decade-to-decade variation, with lowest cover in the 1930's. Fall and spring snow cover as well as seasonal snowfall are also being examined.

Daily reports from over 300 stations in a region stretching from 85-105°W and 30-49°N were incorporated in the analysis. All have records from approximately 1930 to 1988, while approximately half extend back to the turn of the century. All data have been extensively quality controlled.

Empirical studies and models suggest that snow is a critical component of the climate system. The accurate forecasting of daily temperatures, regional climate anomalies and the location and strength of cyclonic systems relies, in part, on knowledge of the distribution and state of regional snow cover. Models suggest that some of the largest climate impacts resulting from increases in greenhouse gases will take place near the present positions of continental snowlines, Associations between these snow trends and other climate variables are presently being studied and are discussed in another conference paper (Robinson and Hughes, 1990).

THE EVOLUTION OF LAND PLANTS: EVIDENCE OF GAIAN CLUMSYNESS? (THE NEED FOR GEOPHYSIOLOGY) by J.M. Robinson, Dept. of Geography and Earth System Science Center, Penn State University, University Park, PA 16802

Over the last 450 million years it can be argued that the evolution of land plants disrupted first the atmospheric O_2 balance -- by increasing the rate of burial of organic carbon (causing O_2 increase) -- and then the CO_2 balance -- by increasing rates of chemical weathering (causing CO_2 decline). The evolution of fungi with enzymatic systems that could effectively cycle the forms of organic carbon in woody biomass eventually checked the O_2 disruption, but the process took ~100 million years. CO_2 decline may be checked by the adverse effects of cold and low CO_2 on plant growth. However, the acclimatization of plants to cold and CO_2 scarcity has reduced the effectiveness of such feedback.

If biotic controls on planetary processes are anything like those hypothesized, it follows that Earth's cybernetic system is slow and inexact, and that the biota may, itself, be a destabilizing factor in the Earth system. In short, if Gaia exists, she is too clumsy and too slow to be relied on to stabilize the Earth system against present anthropogenic perturbations.

Current understanding of the Earth system is inadequate to dismiss either the above hypotheses, or plausible alternative hypotheses involving variations in paleogeography, solar luminosity, climate, orogeny, and outgassing of the mantle. Conclusive testing requires a synthesis of many disciplines, including bio- and paleogeography, geology, geochemistry, climatology, biochemistry, and physiology.

MAPPING SEPARATE REALITIES AND FUTURES POSSIBLE FOR AGRICULTURAL INNOVATION IN RURAL LANDSCAPES by Dianne Rocheleau, Graduate School of Geography, Clark University, Worcester, MA 01610.

The international agricultural research community has recently embarked on a journey into the terra incognita of "sustainability", and it would like us, as geographers, to help map the terrain. This paper explores the terms of reference for the task as currently defined by the international research centers, as defineable by ourselves and as negotiable with the current residents of this newly "discovered" domain. Experience in agroforestry research and development programs in Africa indicates the need and potential to map the separate realities of various actors in land use change and technology innovation, at multiple scales and over time. Images of overlapping domains of use, interest and control illustrate resource partitioning by gender and class at several sites. These provide social reference grids on which to plot ecological opportunities and constraints by micro environmental niche (in literal 3D space) and by functional niche (in Hutchinsonian terms) While we may choose to simplify the rural landscape into two-dimensional images at 1:250,000, we can invert the definition of "recommendation domain" to make complexity intelligible and to direct technology research toward the pursuit of diversity and equity. We can also adapt the same tools to facilitate greater participation of rural people in designing future landscapes and technologies and in re-drawing the boundaries of the rural space economy.

KAINJI LAKE AFTER 21 YEARS: A PROBLEM IN CAUSAL INFERENCE by Wolf Roder, University of Cincinnati, Cincinnati, OH 45221-0131 and Nigerian Fisheries Institute, PMB 6006, New Bussa, Kwara State, Nigeria.

An examination of Kainji Reservoir on the Niger 21 years after dam closure. The Lake is part of Environmental change which includes fish and other aquatic life, agriculture, road and river-lake transport access, electrical lines, and new schools and health facilities. At the same time the Lake is set in a changing economy of falling currency values and concomitant reduced levels of living and economic activity. The geographic change in the lake region is described. Causal inferences from reservoir existence to environmental and economic results are confounded by parallel secular changes in the national, regional, and local economies. The problem of causal inference in geographic development is discussed.

SPATIAL ANALYSIS OF A FINANCIAL MERGER by Christine M. Rodrigue, California State University, Chico 95929, and Area Location Systems, Northridge, California, and Virginia L. Oliver, Area Location Systems, Northridge, California 91324.

Area Location Systems, a business location consulting firm, has developed a proprietary data base and mapping system for the financial industry. This geographic information system encompasses 8,022 bank and savings and loan offices in California. The GIS encodes 56 discrete variables derived from complete field analyses of each location's site characteristics. Among the variables are locational specifications, such as address, zip code, and census tract number; branch deposit levels; and site qualities, such as traffic flows, accessibility, retail compatibility, size and type of building, signage and visibility, appearance, and on-site facilities. Since the ALS GIS uses AutoCAD for mapping, each branch file includes latitude and longitude co-ordinates in order to permit AutoCAD to generate accurate maps. All branches in the GIS are periodically revisited for field updating.

Several Southern California financial institutions utilize the ALS system in order to evaluate acquisition and merger candidates, compare the performance of their own branch networks both internally and in comparison with competing networks, and assess the competitive situation for potential new branch offices as well as extant branches. This paper details the use of this fieldwork-based GIS by one financial institution to evaluate the spatial complementarity of another institution's branch office network in the course of merger negotiations.

SYNOPTIC VARIABILITY ASSOCIATED WITH SEA LEVEL PRESSURE TELECONNECTIONS by Jeffery C. Rogers, The Ohio State University, Department of Geography, Columbus, Ohio 43210-1361.

Rotated principal component analysis of hemispheric mean sea level pressure data (1899-1986) reveals four teleconnection patterns over the North Atlantic Ocean-Western European area which recur on a month-to-month basis and which are closely linked to synoptic variability and mean climatic conditions. The four patterns include the North Atlantic Oscillation (NAO), a surface manifestation of the East Atlantic pattern, and European patterns with centers over Scandinavia and southern Europe. Each pattern contributes to the structure of the Atlantic mean pressure field, for example the European patterns are linked to the wintertime northeastward extension of the mean Icelandic Low toward the Barents Sea. By examining the extreme cases in the polarity of the component time series it is possible to distinguish (1) the mean synoptic conditions, and (2) the preferred wave cyclone tracks, occurring within each teleconnection and to compare these features among the teleconnections. In winter, the teleconnections are linked to local precipitation variability while significant temperature variations occur over much larger spatial scales. It is found that the NAO is not the only teleconnection linked to the Greenland-European temperature seesaw but it is the only one associated with low frequency temporal variability and multiple decade trends in climate and synoptic activity.

SPATIAL MODELS OF SEQUENTIAL CHOICE by P. Rogerson, Department of Geography, Fronczak Hall, State University of New York at Buffalo, Buffalo, New York 14260.

The traveling salesman problem assumes that each destination is necessarily visited exactly once. Sequential models of search behavior typically assume that the cost of sampling is constant across alternatives. This paper discusses how each of these assumptions may be relaxed to gain insight into spatial problems of sequential search. The problem is phrased in terms of the minimization of the expected cost of acquiring a good, though a number of other applications may also suggest themselves.

The problem is explored for a variety of situations, including a) fixed sample size search, where the problem is to choose both the number of destinations to examine and a route through them; b) sequentail search without recall; and c) sequential search with recall. In the latter two problems, search may be terminated after examination of any alternative.

For each case, the usefulness of assorted heuristics must be assessed, since total enumeration of the expected return from traveling all routes is computationally infeasible.

A TEMPORAL ANALYSIS OF OZONE CONCENTRATION IN NEW ENGLAND by Martha Rogovin and Chi Ho Sham, Boston University, Boston, MA 02215.

Concentrations of tropospheric ozone in New England are increasing. Since ozone is a known phytotoxin and a probable lung irritant, understanding the temporal distribution of ozone may assist in reducing its concentrations and thus attenuating its detrimental effects. Five months of hourly measurements of ozone concentrations at 31 air quality monitoring stations represent both a spatial and temporal distribution of ozone in New England. Analysis of hourly ozone concentrations using the Box-Jenkins time-series models indicate the underlying process in a time-series. The univariate Box-Jenkins ARIMA models that fit the ozone data are second-order autoregressive models with a periodic pattern of 24 hours. Thus the models reflect the persistence of ozone from one hour to the next two hours, and the diurnal pattern of ozone concentrations. The data from some air quality monitoring stations cannot be fit by an ARIMA model, indicating that the univariate approach does not sufficiently describe the fundamental stochastic processes influencing tropospheric ozone concentrations.

THE SPATIAL ACTIVITY OF THE OLDER HOMELESS POPULATION by Paul A. Rollinson, Department of Geosciences, Southwest Missouri State University, 901 S. National, Box 87, Springfield, MO 65804-0089.

This paper uses observational and survey data collected in Kansas City, Missouri to investigate the spatial activity of the older homeless population. Today, homelessness is a human welfare problem of vital national concern and with the older homeless reported to be as high as 19.4 percent of the homeless population it is paramount that this population be understood and reached. Movement of the older homeless is documented using a number of activity space maps and vignettes describing the experience of homelessness. Human experience is the main philosophical concern of the paper; this framework stresses meanings, values, constraints, and coping strategies used by this population.

The spatial activity of the older homeless population is shown to be very constrained. This population has very limited access to, or knowledge of the services that are available. Their isolation is exacerbated by limited exposure to the wider society and therefore they remain hidden, victims of the barriers created by the social service agencies, the built environment, and their own withdrawal. Finally, a number of policy suggestions are made to alleviate some of the daily crises this population faces.

THE PRIVATE SECTOR'S ROLE IN IMPLEMENTING CIVIC VISION 2000 by Joseph D. Roman, Cleveland Tomorrow, 1801 East Ninth Street, Suite 1020, Cleveland, Ohio 44114.

Civic Vision 2000, a comprehensive new land use plan for the City of Cleveland, has had considerable private sector support since its inception. Cleveland Tomorrow and its corporate members, the major local foundations and the Chamber of Commerce have provided all of the funding for the new plan.

Cleveland Tomorrow, an economic development organization comprised of chief executive officers from the fifty largest companies in the area, is committed to a successful implementation of Civic Vision. Accordingly, Cleveland Tomorrow has created the Cleveland Development Partnership (CDP) to stimulate new real estate development consistent with the plan.

CDP is a $40 million limited partnership capitalized by investments from Cleveland Tomorrow member companies designed to invest in key, catalytic projects in the downtown and neighborhood areas. Likely projects include convention hotels, sports facilities, housing and commercial shopping centers. CDP will provide gap financing or equity to help make projects happen on an accelerated basis.

The opportunities and prospects for CDP are expanding and the model has already gained the attention of the Housing and Urban Development Department. The challenge for CDP will be to establish a workable "but-for" investment policy that leverages all other sources of funds. CDP can provide debt or equity or can choose to own land on its own. CDP is governed as a for-profit entity by its general partner, Cleveland Development Advisors, Inc.

THE ROLE OF GROWTH PERCEPTIONS IN THE EMERGENCE OF METROTOWNS by M. Romanos, University of Cincinnati, Cincinnati, OH 45221, C. Chifos, Cornell University, Ithaca, NY 14853, and H. Van Keuren, University of Cincinnati, Cincinnati, OH 45221.

The emergence of semi-independent business centers within metropolitan areas of North America is causing significant transformations of the spatial structure of these regions. We have coined the term "Metrotowns" to describe the most advanced stage of this phenomenon in which these non-CBD centers reach a level of economic maturity and physical appearance reminiscent of the CBD.

This paper focuses on three main questions related to this phenomenon: how do these Metrotowns evolve? are Metrotowns an inevitable occurrence, or are certain preconditions necessary for their appearance? and, how much of this evolution is due to a human perception element? We address these questions by analyzing a survey of approximately 150 targeted "expert actors" which was conducted in the Cincinnati metropolitan area and which investigates evolutionary patterns of 14 business centers in various stages of economic and residential growth.

THE POLITICS OF SITE SELECTION AND PLACEMENT OF ENVIRONMENTAL SCULPTURE by William D. Romey, Department of Geography, St. Lawrence University, Canton, NY 13617.

As modern sculptures become larger, more abstract, and more conceptual the problem of where to place them in both rural and urban settings becomes more complicated. In the past the problem of which equestrian statue should be erected where in which public place created passion resulting from differing personal political views. Sculptures now occupy large spaces, and visual and esthetic qualities create most controversies.

The Government Services Administration selected Richard Serra's Tilted Arc to occupy the Federal Plaza in New York City. From an architectural and sculptural viewpoint this sculpture fit well into its surroundings, but negative reactions from users of the area led to acrimonious court proceedings and eventual removal of the piece. A similar sculpture in another part of the city aroused no controversy and went largely unnoticed. A large Dale Eldred sculpture erected after winning a major competition on a college campus was spirited away during the summer one year when the college president took a dislike to it.

In Grizedale Forest, North England, sculptors invited on residencies create large, modern sculptures in the forest. Public awareness and appreciation of environmental sculpture has resulted. In other places reclamation of abandoned quarries and landfills by making them into sculptures and sculptured parkland provides an important aesthetic approach to the evolution of anthropogenic landforms. Sculptors are beginning to work closely with geographers and landscape architects to develop a climate for acceptance of their work and for establishing a recognized place for modern sculpture in rural and urban landscapes.

THE ATLAS OF AMERICAN SPORT, by John F. Rooney, Jr., Oklahoma State University, Stillwater, Oklahoma 74078, and Richard Pillsbury, Georgia State University, Atlanta, Georgia 30303-3083.

Sports geography has frequently been characterized by empiricist and positivist approaches. Critics have claimed that much of the research fails to capitalize on the significance of sport to modern society. We intend to make a major break from that mode with the publication of The Atlas of American Sport, supplemented by the development of a series of sport geography teaching modules. The Atlas of American Sport, MacMillian 1991-92, will focus on the distinctive role of sport in American society. It will embrace sport and nationalism, sport and regionalism and the complex and kinetic nature of the sport-place bond. The Atlas will be broken into four distinct parts: sport and American society, The Great American Panorama emphasizing mainstream sports, sport regions and the amazingly diverse and highly organized world of local, folk and work related sports.

THE GRADUATE SCHOOL OF GEOGRAPHY AT CLARK AND ITS INFLUENCE ON CANADIAN GEOGRAPHY PROGRAMMES by Courtice Rose, Bishop's University, Lennoxville, Quebec, J1M 1Z7

The Graduate School of Geography at Clarkhas contributed the third largest number of U.S. trained faculty members presently teaching in Canadian geography programmes. Since 1932 over thirty geographers of Canadian origin have traveled to clark for graduate study and twenty of these returned to take up positions at Canadian universities. Their influence on these geography programmes is considered in some detail in this paper, particularly as they have emphasized certain topical areas, regional specializations and specific teaching styles. During the 1970's Clark geographers working in Canada were concentrated in Southern Ontario but recent graduates can be found working in various sectors outside the Canadian Heartland. While the Canadians who went to Clark have worked with nearly all of the Clark faculty over the last six decades, the influence of Professors Van Valkenburg, Murphy and Karaska seems particularly strong. Further examination of these and other linkages indicate the continuing importance for Canadian geographers of the "Clark connection".

WORK, LABOUR MARKETS AND HOUSEHOLDS IN TRANSITION IN CANADIAN METROPOLITAN AREAS by D. Rose, INRS-Urbanisation, University of Québec, 3465 Durocher, Montréal, Québec, H2X 2C6, and F. Villeneuve, Department of Geography, Laval University, Québec City, Québec, G1K 7P4

Three pervasive and interrelated tendencies have affected the changing geography of labour and households in major Canadian cities during the last fifteen years: the tertiarization of metropolitan economies; the feminization of the paid workforce; and the more recent trend toward an increasing polarization of occupational structures in those cities with a large and advanced tertiary sector.

We take as our starting point the reshaping of the labour force by economic sector, occupation and gender. We then argue that in order to explore the social and geographical implications of these trends, it is necessary to examine the types of households formed by the various new segments of the labour force. In an exploratory fashion, we suggest some ways in which the operation of these tendencies, mediated by their impact on households, may be modifying the texture of social space in Canadian cities, and point to some new and challenging research avenues.

Our analysis is based on secondary sources that are complemented with empirical analyses based on special tabulations of census material obtained by the authors for Montréal and Québec City. We draw particular attention to the specific forms taken by these tendencies in Canada, since, as is so often the case, much of the more theoretical literature in the field is informed by the American context or the putative notion of a "North American City".

LAND OFFICE RECORDS AS A DATA SOURCE FOR UNITED STATES MIGRATION RESEARCH by Gregory S. Rose, The Ohio State University at Marion, Marion, Ohio 43302

The purpose of this paper is to describe and assess the use of land records in historical migration research. United States Government Land Office Records provide an excellent source of migration data for the trans-Appalachian region during the frontier period. They are public records available for inspection at state archives and the National Archives. As part of the land office procedures, purchasers were asked to identify their state and county of previous residence. The records typically include a large number of purchasers, making them fairly representative, and the listing of specific locations (counties) is unusual for government records of this era. However, the records contain only the first purchasers (including speculators) of government lands. Many in-state locations of previous residence are listed, especially for purchasers of land on the state's "last frontiers." Occasionally the recording system broke down and clerks listed state origins only or stopped listing previous residences altogether. Examples drawn from the author's research using land office records from Ohio, Indiana, and Michigan reveal the sorts of migration evidence that can be gleaned from these records and illustrate the records' characteristics.

IMAGE AND REALITY ON WISCONSIN'S SETTLEMENT FRONTIER: 1825-1850 by Carol J. Rosen, University of Wisconsin-Whitewater, Whitewater, WI 53190.

The relationship between geographic image and reality has long concerned historical geographers. The purpose of this paper is to investigate the process of settlement in southwest Wisconsin's Lead Region from 1825 to 1850. More specifically, the settler's impressions and evaluations of the physical environment are examined. Contemporaneous maps, as well as unpublished letters and diaries, are used to assess the environmental images. Land claims link the settler's evaluations to actual land use and allow a reconstruction of the settlement landscape.

A look at the frontier through the eyes of its earliest occupants offers insight into the uniqueness of the pioneer process in this region. Wisconsin's "Lead Rush" spanned only a quarter century and by 1850, agriculture was the primary economic activity in the area. Several factors contributed directly to this transition, the most important of which were the depletion of surface ore and changes in land tenure. The pioneer accounts address the impact of these changes as the image of life in a new land became reality.

TOPONYMY OF MORMON SETTLEMENT by L.A. Rosenvall, Department of Geography, University of Calgary, Calgary, Alberta, Canada T2N 1N4

During the nineteenth century over 500 Mormon settlements were founded in an area centered on Salt Lake City but extending into six surrounding states, Mexico and Canada. These settlements provide an interesting case study for determining to what degree place names actually reflect the physical milieu and culture of a people.

Place names are often used as aids to ferret out historical and cultural patterns. Mormon history and culture are known in rather great detail, therefore, a study of place names is not needed in order to understand the broad panoramic view of Mormon history. Instead it should provide a means of filling in historical detail as well as emphasizing and verifying known historical data.

Thus, the purpose of this paper is two-fold: (1) to systematically analyze Mormon place names in order to determine the reliability and validity of using place names as indicators of history and culture, and (2) to graphically use place name research as a tool to illuminate and emphasize settlement patterns and history.

A classification scheme for Mormon settlement toponymy is proposed.

THE MODIFIABLE AREAL UNIT PROBLEM AND SPATIAL ANALYSIS

by Eugenie Rovai, Western Kentucky University, Bowling Green, Kentucky 42101.

The conventional approach to spatial analysis involves the application of a model to a study area partitioned into zones (areal units). A fundamental concern in the analysis of any data set with a spatial component is the organization of the areal units upon which the distribution is based. Unlike laboratory experiments where individual test tubes or mice may represent distinct observational units that enable independent measurement of the study objective, areal units are not standardized or fixed entities. With respect to spatial analysis, the results measure not only the variation of the quantities under consideration but the properties of the unit definition imposed on the system in order to measure it. This problem is generally referred to as the modifiable areal unit problem (MAUP). The MAUP plays havoc with the nomothetic research perspective and thereby forces geographers to reassess the legitimacy of the traditional spatial science paradigm. To apply the nomothetic research perspective to spatial analysis, the results of studying areal data must be independent of the definition of the zones that are under study. This is an unreasonable assumption since with zonal data the process of parameter estimation and zone design are usually completely interdependent. The arbitrary nature of the observational units and subsequent results from analyses cannot then be conceived as examples from which to draw general processes or laws. The existence of the MAUP suggests that researchers need to accept the contextual specificity of their spatial analyses.

FRACTAL FORESTRY: APPROXIMATING CANOPY PROPERTIES FOR CLIMATE MODELS,

by Clinton M. Rowe, Department of Geography, University of Nebraska, Lincoln, Nebraska 68588-0135

Energy and mass transfers at the surface of the Earth are of primary importance in determining climate. These fluxes are, in turn, largely controlled by the type of vegetation present in a region. Increasingly sophisticated models of energy and mass transfers between vegetation canopies and the atmosphere are being used to study the impact of vegetation on climate. These models require detailed information on the structure and architecture of the canopy. Unfortunately, little quantitative information on the architecture of natural vegetation canopies is available, except in summary, or bulk, form such as total canopy leaf area index. These data, which are averages over a finite area and are often vertical summations, are inadequate and misrepresent the three-dimensional architecture of the plant stand. This paper uses fractal geometry to simulate tree growth and development in an attempt to develop realistic approximations to the three-dimensional distribution of branches and leaves within a forest.

SOCIAL NETWORKS IN TIME AND SPACE: HOMELESS WOMEN IN SKID ROW, LOS ANGELES

by Stacy Rowe, Department of Anthropology, and Jennifer Wolch, School of Urban and Regional Planning, University of Southern California, Los Angeles, CA 90089.

Social networks operate within a specific time-space fabric. This paper devlops a theoretical framework for understanding the role of social networks among the homeless. The concept of time-space discontinutiy is offered as a way to conceptualize the impact of homelessness on social network formation, daily paths, life paths, personal identity and self-esteem.

Homelessness often precipitates a shift in the locale of daily paths. This, together with the transient nature of homeless living, fragments traditional networks of family and friends. Alternative networks formed within the context of homelessness provide material and emotional support and work to mitigate the effects of time-space discontinuity.

The daily-path - life-path dialectic of a homeless individual is altered as daily paths become exclusively dedicated to meeting short-term survival needs. These consequences of homelessness: the difficulty in executing long-term projects; the shift in locale; and changes in the social networks; impact an individual's sense of identity and self-esteem.

Ethnographic research among homeless women in Skid Row, Los Angeles, is used to illustrate the framework presented, and to suggest areas for future study that would have direct public policy implications.

ECONOMIC REGION NET MIGRATION PATTERNS IN THE USSR: 1979-89

by Richard H. Rowland, California State University, San Bernardino, California 92407.

This paper investigates economic region net migration patterns in the USSR during the intercensal period of 1979-89. It is based on recently published 1989 census results and natural increase data for the 1980's by economic regions and oblast-level units. Comparisons with net migration patterns during the intercensal period of 1970-79 are also undertaken. The regional framework employed is that of the economic regions of the USSR in 1961. Results reveal that a clear south-to-north net migration trend is occurring. Substantial net out-migration occurred from each of the three southern regions of Central Asia, Kazakhstan, and the Transcaucasus, as well as the Southwest of Ukraine. Net in-migration took place in the northern USSR in general. Within the northern USSR, there has been a relative resurgence in the regions of the Russian East or Siberia, which once again had net in-migration, especially Tyumen' Oblast, which contains major oil and natural gas producing areas. Within the European RSFSR, there has been a reduced rate of net out-migration from the Central Chernozem region and parts of the Non-Chernozem Zone, especially the Volgo-Vyatsk and some oblast-level units of other regions. Indeed, in contrast to 1970-79, in some oblast-level units of the Non-Chernozem Zone net in-migration now occurred. Also within this Zone, net in-migration occurred to the Northwest (Leningrad) and Center (Moscow) regions overall. There was also net in-migration to the West or Baltic region.

REGIONS AND CHOROPLETH MAPS

by Ruth Anderson Rowles, Department of Geography, University of Kentucky, Lexington, KY 40506-0027

This paper focuses on how to define the least number of homogeneous regions for a univariate geographic distribution for a given level of generalization. Regionalization was conducted as a prerequisite for evaluating how well conventional classed choropleth maps communicate overall geographic patterns. Conventional classification methods do not guarantee that the regional patterns formed on the choropleth map are homogeneous and that the boundaries between them are significant. Thus, it is necessary to determine the regions that best describe a geographic distribution.

Regionalization is performed with contiguity constrained iterative partitioning through a modified version of Openshaw's AZP algorithm. Five different types of initial partitions are assessed. Regionalization is performed on 840 geographic distributions composed of 30 samples from 4 types of data distributions (uniform, skewed, normal, bimodal) with 7 different levels of spatial autocorrelation. The best method for consistently producing the lowest number of regions with a GVF (Goodness of Variance Fit) of at least 0.9 is contiguity constrained Ward's agglomerative hierarchical classification for initial partitions followed by iterative improvement. For each type of data distribution the resulting number of regions is modelled as a function of the spatial autocorrelation of the geographic distribution.

FIELDWORK IN HUMAN GEOGRAPHY: PERSPECTIVES AND PROSPECTS

BY GWYN ROWLEY
DEPARTMENT OF GEOGRAPHY, THE UNIVERSITY OF SHEFFIELD,
SHEFFIELD, S10 2TN, ENGLAND.

This presentation seeks to consider the roles and importance of fieldwork programs within human geography. The specific question raised is whether human geography may now be said to be a field discipline! Consideration of past routines provide a backcloth to present and envisaged initiatives. While observational procedures are considered particular attention will be directed to developing interactive programs. The serendipity component of such procedures is to be emphasized!

Special attention will be paid to the developing Questronic routines employed by the presenter within the proceeding program of interactive field research within the West Bank, adjacent to Israel.

The overall endeavor is to demonstrate the necessity for such interactive field programs, their immediacy and attractions for and in initiating and developing particular strategies.

The more sensitive should note that the fieldwork here will be seen to be not only time-consuming and dirty but also frightening and indeed shocking, especially the views of dead bodies in plastic bags!

DETERMINISTIC CHAOS IN GEOGRAPHY: SPECTER OF OUR LIMITATIONS OR SIGN OF RENEWAL IN SCIENCE?
by Alain P. Roy, Department of Geography, 165 Waller St., University of Ottawa, Ottawa, Ont., Canada, K1N 6N5.

We examine some of the recent developments concerning the controversy surrounding the existence of deterministic chaos and discuss possible implications for geography. Like fractals and cellular automata, deterministic chaos invites the researcher to take a new look at nature and universe by offering a new window through which to view them. The links between fractals, automata and chaos are striking. Together, they impel the scientist to re-examine the current usefulness and correctness of the euclidean and linear perspectives in science as well as the importance of predictive power in the appraisal of models. Often viewed with misgivings because of the threat it poses to the established scientific order, deterministic chaos may well contribute to rejuvenate our way of doing science.

This new theoretical approach is not without its own hidden traps, however. The concepts and methodologies developed for deterministic chaos in physics may not necessarily be directly applicable to such fields as ecology or climatology, if at all. The transformation may be mostly conceptual. In fact, there is a parallel to be established with the development of catastrophy theory and valuable lessons may be learned from it.

OPTIMAL REPRESENTATION OF GEOGRAPHICAL PHENOMENA BY RECTANGULAR GRIDS, André G. Roy, Ginette Gravel and André Robert, Département de Géographie, Université de Montréal, C.P. 6128, Succ. A, Montréal, Québec, H3C 3J7.

The optimal selection of points to represent geographical phenomena is of considerable importance in computer cartography. The problem may be stated as finding the minimum number of points to capture the geographic character of an entity. Unless arbitrary thresholds are set, the objective function cannot simply be specified in terms of minimizing errors of representation because they decrease monotonically with the addition of new points. Also, the optimum will vary with the nature of the entity and a general model must encompass the complexity of the phenomenon. The model proposed in this paper uses an objective function that combines errors and handling (or storage) costs which are both a function of sampling resolution. This procedure yields a function with a unique minimum. The relations between errors and sampling resolution are predicted from the fractal model and vary with the fractal dimension (D) of the phenomena. The optimal number of points becomes a function of D. Theoretical parameters for the relations are derived from the application of the semi-variogram to increasingly large windows. The values of the parameters match those obtained from empirical surfaces. Tests of the model using topographic profiles and grids yield satisfactory results. Problems associated with mixing costs and errors and with using D as a descriptor of complexity are discussed.

INTEGRATION OF CANADIAN AND U.S. AUTOMOTIVE INDUSTRIES. by James M. Rubenstein, Department of Geography, Miami University, Oxford, Ohio 45056.

Prospects looked bleak a decade ago for Canadian motor vehicle plants, which were owned entirely by U.S. companies. However, in 1989, Canada, with one tenth of the U.S. population, accounted for 15 percent of the two countries' motor vehicle production. The total output of intermediate-sized Chevrolet Luminas and Buick Regals, full-sized Ford Crown Victorias, and other popular models sold in the United States were assembled in Canada. After describing the distribution of automotive production during the 1980s in Canada and the United States, this paper argues that two factors - labor and capital - explain the changes. Motor vehicles built by Canadian workers score higher on corporate quality audits than those assembled in the United States. Further, U.S. automakers prefer negotiations with the Canadian Auto Workers union, which separated from the U.S.-based United Auto Workers in the early 1980s. At the same time, the cost of doing business has become lower in Canada than in the United States. To some extent, generous financial support from the Canadian and provincial governments have attracted motor vehicle producers, but Canada's principal financial incentive is the substantially lower cost to employers of health care benefits. This paper is part of a larger study on the changing geography of North American motor vehicle production.

THE PRODUCTION AND REPRODUCTION OF URBAN IMAGES: PLACEMAKING, URBAN REDEVELOPMENT AND THE NEW HOMELESS by Susan M. Ruddick, University of California, Los Angeles, California 90024.

This paper examines two as yet unsynthesized processes at work in the development of urban images: analyses of the "literary city", which explore myths about particular cities and periods of urbanization; and the role of placemaking in coalition building, which has to date acknowleged the importance of cultural forms and activities as an aspect of urban redevelopment, but has not examined the relationship of urban mythologies to the process of coalition building and urban redevelopment. Using Central City East, Los Angeles and Hollywood as case studies the paper investigates the process of myth building as a practical activity and aspect of the planning process. Having established the production of myth as a critical precursor to the production of place, it then examines the reproduction and contestation of these myths by the presence and interaction of different users of urban space - specifically consumers or residents, and the homeless.

SHUAR AND COLONO DEFORESTATION IN THE ECUADORIAN AMAZON: A REMOTE SENSING ANALYSIS by Thomas K. Rudel, Department of Human Ecology, Cook College, Rutgers University, P.O. Box 231, New Brunswick, N.J. 08903

The upper reaches of the Amazon basin in southeastern Ecuador offer a particularly interesting setting for studying tropical deforestation because the rates of deforestation vary dramatically over short distances. This pattern is somewhat surprising given that both the Shuar (the indigenous group in the region) and the recently arrived mestizo colonists from the highlands were attempting to expand their cattle ranching enterprises throughout the 1970s. Using maps which depict landownership by ethnicity (Shuar or mestizo) and LANDSAT satellite imagery from the 1970s and 1980s, we will compute deforestation rates for a series of individual Shuar and mestizo communities. The analyses should show large variations in deforestation rates between Shuar and mestizo communities which cannot be explained by proximity to roads. A similar pattern of variation should show up in controlled comparisons among Shuar communities. Political and political economic differences between communities (ground truth) should explain most of this residual variation in rates of deforestation.

A SENSE OF PLACE MODEL OF MOBILITY, by Gundars Rudzitis, University of Idaho, Moscow, ID 83843

Models of locational behaviour using the economic approach do not explain the strong sense of place often attributed to people both in prior survey and humanistic geographic research. In this paper I consider sense of place and its importance within a person-specific human capital model. I also discuss ways of trying to get at the notion of sense of place and assessing its relative importance. Finally, survey evidence is presented which shows that people do develop a sense of place which binds them to their locals more strongly than projected by traditional models of mobility.

CANADIAN INDUSTRIAL EXPANSION INTO NORTHERN NEW YORK by Thomas A. Rumney, SUNY-Plattsburgh, New York 12901

There has been a long history of cross-border industrial-manufacturing activity between northern New York and nearby Canadian areas. During the past fifteen years, however, this process has expanded, especially with the number of Canadian manufacturing firms into the three northernmost counties of New York.

The region of expansion, northern New York, holds a number of attractions for small and medium-sized Canadian firms. It is an area of relatively higher unemployment and lower rates of unionism, provided cheaper labor for the branch plants. It has an "American" market location for product distribution and sales. It is close to headquarters and well-connected to the major urban areas of southern Quebec and Ontario. The locational patterns of these firms also represent Canadian-U.S. access routes and mirror the regional patterns of Canadian manufacturing locations.

CLOSE-RANGE MULTISPECTRAL REMOTE SENSING OF TURBIDITY AND CHLOROPHYLL CONDITIONS IN MANMADE PONDS by D. Rundquist, Center for Advanced Land Management Technologies, University of Nebraska, Lincoln, NE 68588-0517, J. Schalles, Department of Biology, Creighton University, Omaha, NE 68178-0103, J. DeNoyelles, Department of Systematics and Ecology, University of Kansas, Lawrence, KS 66045, D. Goodin, Center for Advanced Land Management Information Technologies, University of Nebraska, Lincoln, NE 68588-0517, B. Hayes, Department of Biology, Creighton University, Omaha, NE 68178-0103, M. Schlemmer, Center for Advanced Land Management Information Technologies, University of Nebraska, Lincoln, NE 68588-0517, and P. Yamamoto, Center for Advanced Land Management Information Technologies, University of Nebraska, Lincoln, NE 68588-0517

A Spectron SE-590 portable spectroradiometer, providing 252 channels of data from 400 to 1100 nanometers, was positioned on a truck-mounted telescoping boom and extended over two small manmade ponds located on the Nelson Ecological Reserve in Lawrence, KS, during July of 1989. Two experiments were conducted: 1) a pond with a clay bottom was highly stirred and then diluted with fresh water over a period of approximately five hours while both calibration (using a BaSO4 panel) and spectral measurements were taken every 15 minutes; and 2) a chlorophyll-enriched pond was diluted using the same procedure as described in #1. Solar conditions were monitored during both experiments. Concurrent water-sampling provided data on turbidity, suspended solids, transmittance, temperature at various levels, oxygen, chlorophyll levels, and numerous other parameters. Preliminary results indicate that consistent, logical relationships can be established between the spectral data and the water-sampling information.

TOPONYMIC STUDIES AND INDIGENOUS CULTURES IN THE UNITED STATES AND CANADA by Robert A. Rundstrom, Geography Program, George Mason University, Fairfax, Virginia 22030.

Toponyms signal specific human/environmental relations and concepts of space. North Americans of European heritage sometimes view indigenous North American's place-names as simplistic, yet such toponymic systems can be complex. Place-name studies can play a role in the adjudication of land claims, cultural/linguistic preservation, survival education, and search and rescue efforts, as well as provide insight into specific relations to the land/sea.

In this paper, I will discuss some theoretical aspects of indigenous toponyms and present a case study drawn from research underway in the Canadian Central Arctic. Inuit researchers have begun a large-scale, multi-year project collecting all Inuit place-names used by Inuktitut-speaking residents of Arctic communities. Names, stories, and other geographic and cultural data are being gathered in the native language, and native people are intimately involved in the entire research process. Expected outcomes include a Gazetteer of Nunavut and official acceptance of the names by the federal government of Canada.

ANOTHER ROADSIDE ATTRACTION: THE CULTURAL TOPOGRAPHY OF OREGON'S HIGHWAY 99 by Peter L. Russell, Geography Dept., University of Oregon, Eugene, OR 97403-1218.

Former major American highways offer the astute observer a slipway into our past. Highway 99 in Oregon, which stretches nearly 300 miles from the state's northern to southern border, presents just such an opportunity. The project inventories and analyzes selected sections along the highway at roughly 30-year intervals. These transects range from slices of metropolitan strips to mid-sized towns to rural settings and bypassed hamlets. Maps, newspaper articles, historic photos, city directories, tour guides, and fieldwork recreate the road's morphology at different stages of development. These sources provide insights into what this pioneer trans-West Coast route means to the region's past, present, and future. Between the road's 1923 paving and the present, 99 changed markedly in terms of land use, function, and roadside architecture. It shifted from the state's prime route into a pale parallel of Interstate 5. The paper concludes with suggestions for preserving specific sites as archetypes of an early U.S. highway and why such slower paths are necessary in the interstate era.

CONTINENTALISM AND THE FREE TRADE AGREEMENT: THE EFFECT ON CANADA by John Ryan. Department of Geography, University of Winnipeg, Winnipeg, Manitoba R3B 2E9

Historically, continentalism has always been encouraged in varying degrees in both Canada and the United States by a variety of forces in the economic and political spheres. The concept of continentalism is at the heart of the Free Trade Agreement and it proved to be as emotional and divisive an issue in Canada's 1988 federal election as it was in the elections of 1896 and 1911. With the strong support of the business community, combined with a split in the two opposition parties, a minority of the electorate elected a majority government which promptly enacted the FTA. An immediate plethora of business mergers and plant closures, along with complementary government legislation, is now changing the Canadian economy and society. The full effects of this treaty are gradually unfolding on the Canadian public. An analysis of the FTA shows that most of its provisions have less to do with trade and tariff reduction than with its effectiveness in limiting the power of Canada as a nation state to intervene in the economy, especially as it relates to energy and other resources. FTA provisions are far more restrictive than GATT regulations and there is evidence that these may adversely affect Canada's energy supplies with respect to "proportional sharing," pricing, and "disruption of normal channels of supply." The application by US-owned oil companies for export licences for natural gas from Canada's north was facilitated by the FTA, and a megaproject pipeline may soon follow with questionable effects on both the economy and the environment. The FTA may also facilitate the export and diversion of water from Canada to the USA.

THRESHOLD-CONTROLLED SHORELINES OF LAKE BONNEVILLE--A HYDROGRAPHIC-ISOSTATIC MODEL by Ted N. Burr, Boswell-Olsen Enterprises, Orem, UT 84058, Donald R. Currey, Department of Geography, University of Utah, Salt Lake City, UT 84112, and Dorothy Sack, Department of Geography, University of Wisconsin, Madison, WI 53706.

The most recent deep-lake cycle in the Bonneville basin, the Bonneville lacustral cycle, lasted from about 28,000 to 13,000 yr B.P. An initial phase of closed-basin, oscillatory-transgressive stages occurred from approximately 28,000 to 15,300 yr B.P. This was followed by a period of intermittently open-basin, threshold-controlled stages, which lasted from about 15,300 to 14,200 yr B.P. The two most prominent Lake Bonneville shorelines, the Bonneville and Provo Shorelines, formed during this second phase of the lake cycle. At about 14,200 yr B.P. Lake Bonneville returned to closed-basin conditions, and the water fell rapidly to very low levels.

G.K. Gilbert first recognized that even the threshold-controlled shorelines of Lake Bonneville formed under changing relations of water and land. This paper presents a detailed, hydrographic-isostatic model of the threshold-controlled shorelines of Lake Bonneville. The model is based largely on geomorphic and morphostratigraphic evidence from the Stockton Bar area, Utah. This area contains large Lake Bonneville coastal depocenters, and is located in an isostatically sensitive (basin interior) location. As indicated by the physical evidence at Stockton, the Bonneville Shoreline Complex is composed of nine threshold-controlled stages and three subthreshold stages; the Provo Shoreline Complex is composed of seven threshold-controlled stages. Isostatic responses, climatically induced oscillations, and threshold geomorphic dynamics are used to explain specific shoreline components. Radiocarbon dates constrain the model temporally.

DROUGHT AND FAMINE IN AFRICA: HUMANISTIC OR NATURAL? by James Saku, Department of Geography, Wilfrid Laurier University, Waterloo, Ontario N2L 3C5.

Drought and famine are not new. They are events which occurred even during biblical times. With technological advancement, man has been able to overcome this problem in the developed world. However, in Africa and other less developed countries, these two events are endemic. This is indicated by the events of the mid 1980's in both Ethiopia and the Sahelian zone of West Africa where thousands of people starved to death. While some researchers attribute the persistence of this problem to 'Acts of God' (Natural), others believe that it is more of a human factor.

This paper aims at examining this controversy. Both natural and human arguments are presented and conclusion drawn as to what the author believes are the true causes of famine in Africa. Possible remedies are offered to arrest the present situation.

Bernard MAIRE (1), **Gérard SALEM**(2)

(1) ORSTOM, nutritionniste.

(2) ORSTOM, Department of Geography, University of Montreal, Geographer

URBANISATION AND NUTRITIONAL STATUS IN AN AFRICAN SUBURB : PIKINE (SENEGAL)

Is the spatial diversity of African Cities reflected in health indicators? We've examined this question through the analysis of nutritional status which could be considered as a good indicator of primary health in this population. After an initial census of the whole population in Pikine (Senegal), all mothers and their under-five children were surveyed in ramdomly selected sampled of 45 districts environmental and socio-cultural data were further confronted by spatial analysis methods and clustering of different variables at the level of each district. The aim of the study is to emphasize areas where the population is more at risk.

THE POLITICAL ECONOMY OF DESERTIFICATION IN CENTRAL SOMALIA by Lance Salisbury, The University of Iowa, Iowa City, Iowa 52242.

The Central Rangelands of Somalia have undergone an increase in recent years in the number of fenced enclosures, which have in turn led to an increase in crop production in the region. These changes in land use practices have led to an increasing amount of desertification in a region of Somalia that has historically been a center of livestock production. This paper examines the underlying mechanisms behind these land use changes, and resulting desertification. The suggestion is that these processes should be seen as a symptom of, or a response to broader changes in the economic relationship between pastoralists and the state in Somalia.

SPACE, PLACE, AND URBAN POLITICAL ECONOMY by Scott Salmon, Department of Geography, Syracuse University, Syracuse, N.Y. 13244-1160.

The contemporary social and spatial restructuring of the international economy is generating rapid change in the structures of many urban political economies. As this restructuring progresses it is disassembling not only the existing urban fabric but the framework of conventional urban analysis as well.

The notion that 'space makes a difference' in the fortunes of different cities has been generally recognized in recent attempts to reconceptualise social theory but, as yet, there appears to be less agreement as to the most adequate means of dealing with the role of space in explantory accounts. Considerable disagreement persists as to the causal (or contingent) status of spatial or place 'effects' and, consequently, over the degree to which these factors can be generalized in theoretical accounts.

This paper explores some of the conceptual and theoretical issues involved in developing an appropriately geographical analysis of urban politics, drawing, in particular, on the previously independent debates regarding the role of 'place' in structuring the political process and that relating to geographically uneven development.

"What Geographic Dynamics Lead to Hillside Cities and Hillside Residences?" by C. L. Salter and Alyson Greiner, Department of Geography, University of Missouri, Columbia, MO 65211.

Locational decisions are volitional decisions. One of the most basic human decisions--both in the collective and the individual instance--is the residential decision. This paper explores the geographic dynamics of this process in reference to individual locational decisions for personal residences. What is the dynamic that leads people to seek the urban hillside for their homes? Is there a unique place utility to the hillside residential environment? Los Angeles, California is the primary focus for this study because of the scale and variety of hillside residences within its metropolitan area. Aspects of the personal and collective decision for hillside residence include aesthetic attractions, privacy, non-urban prospect, status, and landscape differentiation (both visual and climatic) between residence and employment locations. Cost factors that must be allied with these geographic attributes include the cost of utilities, municipal services, natural and environmental hazards, and isolation. Finally, there is a preliminary attempt to answer the question, "Can cities afford to sustain hillside residences?"

BROWN vs. SCHOOL BOARD OF TOPEKA, KANSAS: GEOGRAPHIC ANALYSIS OF BROWN III by Paul S. Salter, Department of Political Science, Washburn University, Topeka, Kansas 66621.

The purpose of this paper is to present a historical-geographic analysis of the now-famous 1954 Supreme Court decision "Brown vs. Board of Education of Topeka" regarding desegregation of public schools. The issue as decided by the Supreme Court in 1954 still has not been fully resolved and has been before the federal courts from that time to the present. The issue that the plaintiffs have asked to be resolved is did Topeka ever fully desegregate? The plaintiffs in the case argue that the school district never complied with the original mandate to establish a unitary and integrated school system "with all deliberate speed."

This paper will attempt to analyse the racial characteristics of the present Topeka school districts and to present geographic evidencé to attempt to explain the geographic reasons for the racial characteristics of the present school attendance districts.

Perceptions and Value Systems of American Society Toward Recreation Activities:The Case of State Parks in Massachasetts,by Habis Samawi,Ph.D Geography Department,Jordan University,Jordan,and Robert Donell,Framingham State college,Ma,and Yaser Najjar,Framingham state college,Ma.

The purpose of this study is to investigate and explain the perceptions and Value systems of state park Users in Mass. To acheive this task visitors were collected by means of site questionnaire survey.The questionnaire comprised items related to demographic,socio-economic,trip information,and the perception of state parks Users .

The study area has been divided into five recreational regions,within each region a state park that appears representater as a region was chosen for the survey.105 interviews were completed to every park. Therefore , a total of 525 visitors were interviewed .

In order to identify the factors which affect the perceptions of Users,a multiple regression analysis was used. The analysis has formulated a set of mathematical models which explains the functional relationship between perception and value systems toward specific recreational activities, and the demographic and socio-economic characteristics of state park Users .

"Social Implications of Deforestation in The Sierra Region of The Cordillera Central, Dominican Republic", by Richard A. Sambrook, Department of Geography, Central Michigan University, Mt. Pleasant, Michigan, 48859, and Robert N. Thomas, Department of Geography, Michigan State University, East Lansing, Michigan, 48824.

Dominican timber reserves of the 1920s have been largely depleted. The major share of the forest cover removal occurred as a result of commercial lumbering between the end of World War II and 1967 when the government banned the cutting of live trees. Despite the military's enforcement of this legislation, accelerated conversion continues.

The Sierra region of the Cordillera Central illustrates an area where the processes of high population growth, deforestation, environmental degradation, and dynamic patterns of rural population redistribution occur together. Section level forest cover maps indicate the region was essentially a forested frontier in 1960. By 1980, forest cover disappeared at an average rate of 1.8% annually or 35.3% in twenty years.

Although the research demonstrates an overall trend toward out-migration, a number of significant exceptions exist. We propose that these areas represent former forested frontier nodes where access roads associated with commercial lumbering facilitated selective in-migration.

RETHINKING THE SIGNIFICANCE OF URBAN DIVERGENCE by R. Sanders, Temple University, Philadelphia, PA 19122.

Previous geographic literature relating to global patterns of urbanization and urban development indicated a concern with the differences between cities of the Third World and cities in more developed countries. More recently, this concern is lacking and the emphasis leans more toward concrete spatial planning for urban system development. In this paper, I argue that the urbanization process in the Third World differs dramatically from that in the more developed countries. This diverence from Western based expectations is significant for several reasons. First, from a knowledge perspective, it suggests a need to rethink what we know about urbanization in general. Second, from a policy perspective, a lack of convergence requires that we address urban planning issues in a radically different way and may even mean that we are unable to plan for urban development in the Third World. Third, in terms of theory formulation and model building, divergence suggests that we might need to "return to the drawing board." Finally, I argue that urban spatial planning in the Third World must begin with an assessment and understanding of the urbanization process as it exists in the Third World before we can be effective in our planning efforts.

BUILDING AN INSTRUCTIONAL GIS: LESSONS LEARNED FROM *OSU MAP for-the-PC* by J. S. Sandhu, Department of Geography, The Ohio State University, Columbus, Ohio, 43210.

OSU MAP-for-the-PC is a grid-cell based geographic information system which is used by many universities to support the laboratory component of introductory GIS courses. The Ohio State University is currently distributing version 3.0 of this software. A discussion of the initial development of *OSU MAP-for-the-PC* was presented at Auto Carto 8. Since the release of the initial system, a substantial number of changes have occurred in the design and implementation of the software. This development has proceeded with the help of many software engineering tools and this enabled the project to withstand substantial changes in compilers and support tools. In the course of this project inputs have been supplied by many users and academic partners, and many important lessons have been learnt in the area of instructional software development and the teaching of GIS. Among the problems identified in the latter area are inadequate geographic data sets, poor software documentation, and a lack of tutorial materials.

This paper summarizes the software and instructional lessons learned from this project, and presents some approaches that have been used or could be used to alleviate problems within this field.

JOHN WESLEY POWELL'S VISION OF ARID LAND SETTLEMENT REEXAMINED by Robert A. Sauder, University of New Orleans, New Orleans, Louisiana 70148.

Few people in the late nineteenth century were as knowledgeable about the difficulties associated with arid land settlement as John Wesley Powell. Powell's Report on the Lands of the Arid Region of the United States (1878) was essentially a warning about the consequences of trying to impose on a dry country the habits that had been formed in a wet one. Although it is widely assumed that the application of the public land disposal measures, which were largely designed for settlement in humid or subhumid environments, "produced more failure and fraud than family farms" in dry environments, no detailed empirical studies have tested the accuracy of Powell's recommendations for western settlement. This paper examines the process and progress of settlement in two sample townships in Owens Valley, California within the context of Powell's arid land proposals. In the better-watered north end of the valley, in T7S R33E, where compact settlement was fostered by an abundant water supply, the public land laws worked well in placing bona fide settlers on the land. Powell's fears regarding land and water monopolization resulting from the prevailing land disposal system were unwarrented judging by the developments in this township. On the other hand, in the drier southern half of the valley, in T15S R36E, the failures and abuses that Powell had warned of were pronounced, resulting in few permanent improvements in this township. The degree of accuracy of Powell's proposals regarding arid land settlement appears to be linked to the environmental attributes of particular places.

SURFACE ENERGY FLUX ESTIMATION IN AN ALPINE TUNDRA ENVIRONMENT by I. R. Saunders and W. G. Bailey, Department of Geography, Simon Fraser University, Burnaby, B.C. V5A 1S6 Canada

Physically based surface energy flux modelling procedures explicitly recognise the roles of atmospheric and surface controls, but their application has been very limited in alpine tundra environments. The purpose of this study was to compare different physically based methods of sensible and latent heat flux estimation in an alpine tundra. The research formed part of a wider examination of alpine tundra climatology. The methods tested were the aerodynamic, eddy correlation, Ohm's Law analogue, combination and equilibrium equations, using comparative data derived from the Bowen ratio-energy budget (BREB) method. Data were collected from two field seasons in the Cascade Mountains of southern British Columbia.

Results indicated that a moisture-limiting evaporation regime generally existed, allowing sensible heat flux magnitudes to be similar to those of latent heat. Estimations of hourly sensible heat fluxes using the eddy correlation and Ohm's Law approaches showed agreement with BREB data. Preliminary evaluations of latent heat estimation employing the combination and equlibrium methods were favourable. The aerodynamic equations were applicable for both sensible and latent heat but were sensitive to the small vertical temperature and humidity gradients commonly found in the alpine tundra. Overall, the results showed that several physically based methods of surface energy flux determination performed satisfactorily in alpine tundra and that further investigation would be merited.

HUMAN INFLUENCE AND THE MORPHOLOGY OF THE FOREST LANDSCAPE by M. Savage, National Center for Atmospheric Research, Boulder, Colorado 80307-3000.

The ability to understand the separate influences of human versus natural disturbance in ecosystems is crucial to predicting the development of the landscape. I studied change in the Navajo ponderosa pine forest over the past several hundred years to elucidate the impact of disturbance, both anthropogenic and natural, on community structure. The objective was the determination of the relative importance of historical factors--grazing, fire regime alteration, and logging-- and climate fluctuations in changing the forest structure.

Evidence indicates major structural change over this time, from an open, park-like forest to a significantly denser, younger one. A comparison of reconstructed past stand structure with present structure documents this trend. A GIS analysis of the landscape, comparing aerial photos over time, confirms it.

Land use changes in the forest resulted from seasonal pastoralism begun in the 18th century. Grazing pressure fluctuated but often exceeded carrying capacity. A fire-scar chronology suggests that the early regime of light, frequent fire dropped suddenly and persistently around 1830, primarily due to a reduction in fine fuels accompanying grazing.

Climate conditions over this time span, assessed using instrumental and proxy data from tree-ring indices, indicate an anomalous warming trend and wet decades early in this century.

The timing of the dramatic structural change in this forest in the early 20th century suggests that while climate change was probably the proximate agent, its influence was greatly enhanced by land use changes.

STATE TERROR: SOCIAL JUSTICE AND THE USE OF PUBLIC AND PRIVATE SPACES by Joseph L. Scarpaci, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

State terror is increasingly deserving serious attention because of the insights it provides about political and economic aspects of society. This paper examines the use of state terror in the Southern Cone in past decades and shows how military governments justified attacking largely unarmed populations. It then identifies citizen responses to state terror and national security doctrine.

This case study suggests that the use of public and private spaces by state aggressors and human rights groups has followed a consistent logic in Argentina, Chile, and Uruguay. It also shows how civilian versus military courts are manipulated to handle alleged crimes against the state. Throughout the region private spaces are conducive for the abduction of state enemies and for anti-state conspiracy while public spaces serve as important landmarks for detention and torture as well as denouncing state terror. The dialectic or resolution of these uses of the city offer distinct interpretations about the meaning of social justice which can enhance our understanding of this region's transition to civilian rule.

EFFECTS OF CLIMATE ON STRENGTH OF THE PODZOLIZATION PROCESS IN MICHIGAN by R.J. Schaetzl, Michigan State University, East Lansing, MI 48824-1115, and S.A. Isard, University of Illinois, Urbana, IL 61801-3671.

Soil Conservation Service data indicate that well and moderately well drained, sandy Spodosols are found only in the northern half of the lower peninsula of Michigan, a region that supports mixed coniferous-deciduous forest. Here, degree of soil development varies markedly; strongest soil development occurs in western and northwestern lower Michigan.

Strong Spodosol development, and hence podzolization, is associated with various climatic factors, such as infiltration, "soil freezing potential", and deep snowpacks. Deep snowpacks inhibit soil frost, allowing for unrestricted infiltration of large quantities of meltwater into the mineral soil during the snowmelt period. Correspondence between areas of increased autumn infiltration and strong Spodosol development further suggests that wet soil conditions at the onset of winter are important to the podzolization process, probably by inhibiting soil frost. We conclude that mixed coniferous-deciduous forest vegetation is basic to the development of Spodosols in Michigan, but that various aspects of climate, especially frequency of years with high amounts of snowmelt infiltration, interact to intensify the podzolization process.

GIBSONTON, FLORIDA--SEASONAL RETREAT FOR THE CIRCUS-CARNIVAL WORLD by Harry J. Schaleman, Jr. and Dewey M. Stowers, Jr., University of South Florida, St. Petersburg, Florida 33701-5016

Through fieldwork, interview, and investigative research, the authors studied one of the nation's unique and interesting communities. The Gibsonton-Riverview area southeast of Tampa, Florida, is the largest seasonal residence for circus and carnival people in the United States.

The purpose of this descriptive and informative paper is to understand the underlying physical and cultural geographic forces that spawned and shaped the community in the mid 1940's. Inexpensive land, lack of zoning restrictions, favorable winter climate for off-season relaxation, proximity to the already established Ringling circus settlement in Sarasota, and escape from the rigors of a nomadic life-style are prime factors in site location. Professional equipment in yards and driveways and decorative circus-carnival themes on garage doors and walls reflect the present diversity of the community.

The Showtown Lounge on busy U.S. 41 serves as an informal social center. The feeling of circus-carnival identity runs deep, as the show people support their own local and national professional associations and maintain a show museum, cemetery, and social clubs.

Like counterpart communities scattered elsewhere in the country, the show people find their community spirit threatened by the influx of non-show residents. Consequently, the character and integrity of this Florida enclave face new challenges as the community expands.

INFLUENCES ON THE COLONIZATION OF POST-REVOLUTIONARY CENTRAL NEW YORK by Richard H.Schein, Central Michigan University Department of Geography, Mt. Pleasant, MI 48859.

On July 25, 1782 the revolutionary New York legislature optimistically earmarked almost two million acres of Iroquois land located well beyond the bounds of Euro-American settlement for future disbursement to New York's soldiers in Washington's Continental Army. Within forty years those lands would be colonized - obtained, systematically surveyed, subdivided, speculated upon, and finally, settled, - as the post-Revolutionary New York frontier underwent the process of becoming integrated into the fabric of the new American nation.

This paper examines the colonization of what became known as the "New Military Tract" as the creation, alteration, and realignment of a spatial order between 1782 and 1820. Important influences on colonization patterns and processes are represented in a matrix that includes: 1) a distinction between settlement patterns effected from places external to the Tract itself and their refinement in response to local needs and demands and 2) the importance of regional cultural traditions, environmental adaptations, and the continual integration of the new territory with a developing American core. Such a matrix is useful in understanding many components of the resultant settlement system, including land dealings, economic practices, transportation and circulation patterns, social groupings, and village formation.

REGULATED DISCHARGE AND MARSH DEVELOPMENT, COLORADO RIVER IN GRAND CANYON by J.C. Schmidt, Departments of Geography and Geology, Middlebury College, Middlebury, VT 05753, B. T. Brown, Consulting Ecologist, Box 3741, Tucson, AZ 85722, and L. E. Stevens, Ecologist, Box 1315, Flagstaff, AZ 86002.

Since completion of Glen Canyon Dam in 1963, cycles of development and destruction of riverine marshes along the Colorado River in Grand Canyon have been directly related to patterns of water release. Before 1963, riverine marshes did not exist in this bedrock gorge. Riverine marshes developed on sand bars within large eddies during an 18-yr period following dam closure when mean annual peak flow did not exceed 0.3 times the pre-dam peak and when daily discharge fluctuated widely. At our detailed study site, marsh vegetation densely colonized a sand bar within the first 8 yrs of this period (1965-73). This bar was inundated less than 2 percent of the time.

Riverine marshes were not scoured by a short duration flow 0.5 times the pre-dam peak in 1980. In 1983, marshes were deeply scoured and in most cases entirely removed by a long duration flow whose peak approximately equalled the pre-dam annual peak flow. Recolonization of eroded marshes did not occur during a subsequent 3-yr period of long-duration peak discharges about 0.5 times the pre-dam peak flow. With the resumption of lower fluctuating discharge in 1987, aggradation of scoured bar surfaces and recolonization by plants occurred.

The initial period of low peak flows was associated with the filling of Lake Powell reservoir, and the higher flows occurred after the reservoir had been filled. New habitats created by river regulation, therefore, may be destroyed when management criteria for reservoir operations change.

PEDIATRIC CANCER MORTALITY: NEW JERSEY AND THE UNITED STATES, ONTARIO AND CANADA by Dona Schneider, Rutgers University, New Brunswick, NJ 08903 and Christine Hampson, Brock University, St. Catharines, Ontario, Canada L2S 3A1

Mortality from pediatric cancers has decreased over time, especially as treatments have both improved and become standardized. While the long-term trend is a decline in these death rates, differences exist in the rates of decline depending upon race, gender and specific type of pediatric cancer.

Pediatric cancer mortality data from New Jersey and the entire United States, Ontario and the whole of Canada are examined and compared for multiple time periods. The results are presented by race, sex, region and national affiliation. Differences between pediatric cancer mortality rates for different groups in different time periods are noted and possible explanations offered.

AN EXACT NETWORK REPRESENTATION OF A "CLASSIC" SCHOOL DISTRICTING PROBLEM

by O. Benjamin Schoepfle, Department of Geography, Boston University, 675 Commonwealth Avenue, Boston, Massachusetts 02215, and Richard L. Church, Department of Geography, University of California - Santa Barbara, Santa Barbara, California 93106.

Declining and fluctuating enrollments of the last decade have necessitated changes in the sizes and locations of schools in hundreds of districts across the United States. School administrators are then faced with the difficult and complex problems of redistricting, compounded when desegregation is at issue. Researchers have worked for two decades with variants of a linear programming districting model which minimizes total weighted distance as all students are assigned to schools which are subject to capacity and racial balance limitations. This model could aid in the construction of districting alternatives but in practice is difficult to solve with generalized solution methods due to excessive size. Network-based representations have been actively pursued because of the existence of fast special algorithms and codes. However, single-network representations have been successful in modeling only special cases of this problem. We present here a generalized network flow problem with side constraints which is an exact equivalent of this classic districting problem. This is the first published districting model based on this network type.

ON THE GEOGRAPHY OF HIGHER EDUCATION IN LATIN AMERICA by Jerry P. Schofer, Public Administration, Rutgers University, Newark, NJ 07102.

An analysis of the locational patterns and locational histories of systems of higher education can provide insights into regional cultural differences. Utilizing the founding dates of universities, the author describes, maps, and examines the geographic context of higher educational institutions in several Latin American countries. The study reveals a spatial diffusion process coincident with the region's settlement history--combined with pro-urban locational biases characteristic of other Latin American and Continental European cultural institutions.

A GEOGRAPHICAL EXAMINATION OF WATER MARKETING IN THE WESTERN UNITED STATES by P. Andrew Schoolmaster, Department of Geography/Anthropology, University of North Texas, Denton, Texas 76203.

Water marketing involves either the purchase or transfer of water supplies between a willing buyer and seller. As traditional structural approaches characterized by large-scale, capital intensive projects such as reservoirs and dams become less feasible alternatives to increasing supplies, the demand side strategy of water marketing has increased in interest and practice. Numerous water market transactions are occurring throughout the western United States with Colorado, Nevada, New Mexico, Texas and Arizona reporting the most transactions. In most cases the transactions involved the shift of water rights from agriculture to urban uses. This research, using data published in Water Market Update, presents a geographical overview of the nature and extent of water marketing in the western United States.

STATE GROWTH PLANNING: THE GEORGIA INITIATIVE by H. Schretter, Institute of Community & Area Development and Department of Geography, University of Georgia, Athens, Ga. 30602

The State of Georgia, after three decades of largely unplanned, uncoordinated, and poorly directed growth, adopted in April 1989 a comprehensive growth strategy. It consists of policies and programs aimed both at accommodating development in areas already experiencing high growth without deteriorating either their quality of life or the physical environment, and improving the quality of life in low-growth areas through innovative social and economic development programs. The linchpin of the entire strategy is the state mandate for comprehensive, integrated, and coordinated planning at local, regional, and state levels. The prescribed planning process provides, for the first time, a mechanism for formal intergovernmental and private sector involvement in decisions at all levels of government affecting issues of land use, resource protection, infrastructure, economic development, and human services. The overwhelming approval of the State Growth Strategies legislative package by the Georgia General Assembly and its broad-based support by public and private interest groups across the state may be explained as much by the manner in which the strategies were developed as by the appropriateness of the package itself. The project's overall organizational and procedural framework was based on principles of maximizing group participation of key leadership in a creative problem solving process, soliciting the full range of citizens' opinions and expertise about quality growth, maintaining complete openness of the process to the public, and finally, utilizing staff as a technical resource and for group facilitation, not as a decision maker.

ETHNIC DIVISION OF LABOR AND RESIDENCE: POLISH IMMIGRANTS IN WILMINGTON, DELAWARE by Yda Schreuder Department of Geography, University of Delaware, Newark, DE 19716

Since the end of the nineteenth century, changes in the organization of the workplace have had a major impact on both the ethnic division of labor and on residential patterns in North American cities. New labor market structures and hiring practices established new occupational hierarchies, income strata, and social networks among workers in general and among members of different immigrant groups in particular. By focussing on Polish immigrant workers in the leather industry in Wilmington, Delaware, in the early twentieth century, the author first establishes the ethnic division of labor and then proceeds to relate the workplace experience to the immigrant residential community experience. Once established, the Polish immigrant neighborhood became an important element in the leather industry's labor exchange relationship through union organizing and political activities.

ECONOMIC, POLITICAL, AND PHYSICAL GEOGRAPHY OF MILITARY CONFLICT SIMULATIONS. by K. Schroeder, University of Minnesota-Duluth, Duluth, Minnesota, 55812.

Military planners have used conflict simulations, or wargames, for over a century. These simulations have also developed a small following as a hobby around the world. Each simulation is a graphic model of a portion of the earth's surface, with rules describing the movement and supply of military organizations and regulating conflict between them. These simulations offer a highly stylized view of spatial relationships which corresponds to certain theoretical constructs in geography. Conflict simulations allow observation of the interaction of space and military operations at various scales and for all periods of history.

Movement in conflict simulations is usually modeled with a simple hexagonal grid which allows quasi-isotonic movement. Various terrain modifies the movement capabilities of military units and supply organizations and also affects combat abilities. Logistical considerations also affect the ability of units to move and be supplied. Transportation networks can be damaged or augmented by engineers and other simulation capabilities. In simulations incorporating naval and air forces, special rules cover movement and interactions between units in three dimensions. The technology of warfare, scale of combat, and range of weapons all control the interactions between units.

SEÑORA CORDOVA'S KITCHEN: FOOD SUBSTITUTION IN THE SIERRA OF PIURA, PERU by K. Schroeder, University of Texas at Austin, Austin, Texas 78712

This paper examines the food substitution strategies of households in the sierra of Piura, located in far northern Peru. The current economic and political crisis in Peru has forced many of its citizens to dramatically change their diets. One aspect of this crisis involves the significant role that rice has played in Peruvian cuisine. Previously, the government provided low cost rice to its citizens, and women shifted towards meals which utilized more of this carbohydrate. Today the government no longer guarantees low cost rice to consumers, forcing people to find a replacement. Field research conducted in August 1989 reveals that people have recently shifted their diets from reliance on government subsidized rice to dependence on the foods that they produce locally. Informants revealed that, as the price of rice has steadily risen, they consume it only once or twice a week instead of two or three times a day. In the study area yuca, maiz, and trigo are the primary foods substituted for rice. Each of these foods is prepared and consumed in a number of traditional ways, including a variety of mixed dishes that make up a malleable diet, helping people combat the recent price increases

INVESTIGATION OF LOCAL REACH VARIABLES, EIFEL WEST GERMANY by Rolf Schroeder, Arizona State University, Tempe, Arizona, 85287.

Reach variables were measured for 53 river sites in small watersheds in the Eifel, a part of the Rheinisches Schielergebirge in West Germany. Interdependences between these variables and the influence of the outcrop rock structure are discussed to understand the local river reach as a morphological system.

Distribution curves of grain size and grain form of the bed material are given. Downstream patterns of median grain size, sorting and local slope is investigated.

Local slope variations can be explained by variations of median grain size and drainage area, here used to estimate local discharge (multiple regression, $r=0.80$). The data shows strong agreement with Hack's data and relationship $S = c\,(D_{50}/A)^{0.6}$ for the Appalachian (Hack, 1957).

Using factor analysis based on 10 input variables the system "local river" can be reduced to three factors which describe 88% of the variance.

ENVIRONMENT AND SETTLEMENT IN THE HISTORIC STE. GENEVIEVE DISTRICT (MISSOURI) by Walter A. Schroeder, Department of Geography, University of Missouri, Columbia, Missouri 65211.

This paper seeks to discover how French, Spanish, and Americans evaluated the natural environment of the historic Ste. Genevieve District of the eastern Ozarks of Missouri as they established settlements at the close of the eighteenth century. Contemporary documents (land grants, land-confirmation records, litigation papers, correspondence, plats, and travelers' accounts) are the source of information.

Spanish-government land policies, developed from afar, did not take into account variation in land quality and conflicted with local settlers' more sensitive evaluations. Wealthier French differed from poorer French, especially in access to the Mississippi River. Americans differed from French for land suitable for corn. French settled in extended family groups and villages and required larger, compact tracts of arable land, bypassing equally high quality, but smaller tracts which Americans occupied. Americans, as a group, were the least specific in land evaluation. Most highly prized were lead-bearing lands, mill sites, and saline lands. Wealthier settlers and speculators were sensitive to emerging transportation lines. French desired upland prairies for cattle ranches. Because hardwood forests and pine stands were open to anyone for exploitation, they were not the focus of settlement, except for maple-sugar camps.

ANALYSIS OF DAILY TEMPERATURE RANGE VARIATIONS OVER THE UNITED STATES by Joachim A. Schumacher, University of Nebraska-Lincoln, Lincoln, Nebraska 68588-0135.

The daily range of temperature is an often overlooked measure of climate. Vegetation, human comfort, and energy consumption can all be affected as much by the range of temperature during the day as by the daily mean temperature. Most climatological presentations of the daily temperature range, however, have given the daily range in terms of an annual, or monthly, mean value. This monthly or annual averaging tends to obscure important variations in the daily range throughout the year.

Daily maximum and minimum temperatures were used to calculated the average daily temperature range at 151 stations across the United States for the period 1951 to 1980. The results of these calculations indicate that there is considerable variability in the daily temperature range on the interdiurnal, seasonal, and annual time scales.

In addition, there are also significant geographic variations in the annual march of the average daily temperature range. To better delimit the spatial variations, factor analysis was used to find areas having a similar march in their average daily range. Preliminary results suggest that the temporal and spatial differences in the daily range are related to water vapor variations as well as synoptic climatological controls.

LAND CLASSIFICATION FOR RANGE MANAGEMENT AT POINT REYES NATIONAL SEASHORE......by E. Schwalen, Graduate Student, San Francisco State University, Multidisciplinary GIS Center, 1600 Holloway Ave, San Francisco, CA 94132

Range managers of public lands need standardized systems of classification appropriate for effective management of the privately leased range. At Point Reyes National Seashore, environmentalists have lobbied for preservation of native coastal prairies. Ranchers leasing park land are concerned that their investments are profitable. Managers have a rating system which addresses the different resource values of current and desired plant communities. Park policymakers defined "Desired Plant Communities" in terms of plant community attributes. In applying these criteria to actual landscapes, the researcher considered the environmental factors which influence the spatial distribution of vegetation.

A Geographic Information System was used to build a dataset with geologic, topographic, soils, climatic and hydrographic data as well as current vegetation data gathered from range monitoring activities by park personnel. The potential for desired plant communities in range units was modeled comparing similar undisturbed landscape units and weighting by current land cover with the GIS approach. Ecological considerations, such as current species mix of vegetation, were found to be significant variables in modeling desired plant community potential.

AFTER THE CRASH: FINANCIAL SERVICE EMPLOYMENT TRENDS IN U.S FINANCIAL CENTERS By Alex Schwartz, Center for Urban Policy Research, Rutgers University, New Brunswick, New Jersey 08903

In less than two years, stock prices have fully rebounded from the stock market crash of October 17, 1987. But while new records are set on the three major exchanges, employment remains stagnant in most financial and corporate service industries. After more than a decade of rapid growth, these services are now lagging behind other sectors of the economy. In this paper I assess the post-crash performance of the United States' three largest financial centers: New York, Los Angeles, and Chicago. Drawing from a variety of local, state and federal employment data sources, I compare how the three metropolitan areas have fared with respect to such financial and corporate service industries as banking, securities, accounting, and law.

ILLUSIONS FOR REALITIES: THE FAILURE OF ALLOTMENT OF INDIAN LANDS by E. Schwartz, University of Missouri-Columbia, Columbia, Missouri 65211

Mid-19th century policy makers decided that Indians in the western U.S. should be confined to reservations which would serve as schools for assimilation through agriculture. The capstone of this policy was the Dawes Act of 1887, which mandated distribution of individually-owned plots, or allotments. Historians have recognized that allotment led to a paradoxical decline in Indian agriculture as well as the loss of much of the remaining Indian land base. The consensus has been that allotment failed because Indians were not ready for it. My case study of the Siletz reservation in Oregon suggests, however, that Indians who were well-prepared to conform to the ideals of policy fared no better than others, and the real cause of the failure of allotment was the blindness of policy makers to the actual character of Indian lands, a result of both ideology and politics. Thus Indian people were forced to forego real resources -- forests, fisheries, and grazing lands -- for the sake of the politically-convenient Jeffersonian illusions of their supposed guardians.

DETECTING THE EFFECT OF "GREEN-UP" ON SURFACE MAXIMUM TEMPERATURES by Mark D. Schwartz, San Francisco State University, San Francisco, California 94132

In spring many plants break dormancy and begin foliage production. The appearance of leaves ("green-up") triggers a rapid increase in transpiration. Subsequently, this and other processes alter surface layer thermodynamic properties. Normally, several factors mask the impact of this change on surface maximum temperatures. In this study, I used first leaf phenological data (from clone lilacs) as the indicator of transpiration onset, in order to reveal the effects of this change from dormant to transpiring vegetative surface.

Simple plots using 850 -700 mb thickness, surface daily maximum temperature, and hypsometric temperature were examined for variations in the thickness-maximum temperature relationship relative to first leaf date. I then employed a multiple regression model to test the significance and estimate the magnitude of changes in this relationship. The model confirmed that there are significant relationships between the green-up period and surface maximum temperature. For the same thickness value, type "A" stations (agricultural) showed at least a 3.5 ° C reduction in surface daily maximum temperatures over any two-week period subsequent to first leaf compared to a two-week period prior to first leaf. Station locations near major water bodies (type "B") showed a smaller (1.5 ° C) reduction. One implication of these results is that daily weather forecasts from specification and model output may be significantly improved during spring by inclusion of a green-up variable.

SEDIMENT CHARACTERISTICS OF ABANDONED ALLUVIAL CHANNELS by Bill Schwarz, University of Iowa, Iowa City, Iowa 52242

Abandoned alluvial channels are important geomorphological features and ecological sites and the development of these sites begins with sedimentation. Topographic and fluvial attributes, along with local biological processes, determine the character of the sediment deposited.

A study was undertaken to assess the relationship between the geography of abandoned channels and the physical and chemical nature of sediment deposited in those channels. Samples were collected from 30 sites along the Cedar and Iowa rivers in southeastern Iowa. These are meandering, alluvial rivers draining agriculturally dominated watersheds. The sites selected were quantified as to their connectivity to the river and to agricultural fields, time since abandonment, and local topography. The samples were then analyzed for texture, organic carbon, calcium carbonate, nitrogen, potassium, and phosphorous. A statistical model specifying the dependence of the sediment characteristics on the geography of the abandoned channels was used to assess sedimentological processes.

WATERSHED LAND USE AND COASTAL SEDIMENTATION: CITANDUY/SEGARA ANAKAN SYSTEM by J. Schweithelm, Geography Department, University of Hawaii, Honolulu, Hawaii 96822.

The Segara Anakan Lagoon on the southcentral coast of Java, Indonesia is a valuable resource that supports a local fishery, provides a nursery for economically important marine species, and contains the most extensive mangrove forest in Java. The lagoon is rapidly filling with sediment, and will be completely filled by the beginning of the next century if no action is taken. Proposals for saving the lagoon include dredging, constructing sediment exclusion barriers and dams, and intensive sediment control in the watershed of the lagoon.

This study examines the feasibility of reducing the sedimentation rate in Segara Anakan through watershed management by analyzing land use patterns, sediment production processes, and existing erosion control and water management activities in the basin. The analysis is based on a review of secondary data and an extensive reconnaissance of basin lands.

The conclusion of the study is that the Segara Anakan Lagoon is being filled by natural sedimentation processes that have been accelerated by intensive use of watershed lands and flood control measures. While controlling the entry of sediment into the drainage system may be a viable long term strategy, saving the lagoon would require immediate engineering solutions. If watershed management were to be instituted, it would have to be preceded by a geomorphological/hydrological study to identify sediment sources and establish a sediment budget for the basin.

THE TECHNOPOLES OF SOUTHERN CALIFORNIA by Allen J. Scott, Department of Geography, UCLA, Los Angeles, CA 90024.

The paper opens with a brief identification of California's pathway (via flexible production organization) to industrialization and regional growth. The emergence of the aircraft industry in the region in the 1920s and 1930s is described. The formation of the post-War aerospace-electronics industry is then discussed in detail. The geography of Southern California's contemporary technopoles (high technology industrial districts) is outlined, with a particular emphasis on the aircraft, electronics, biotechnology and medical device industries. The functional role of inter-firm linkages and local labor markets in the high technology industrial development of Southern California is analyzed. The paper ends with a few brief allusions to the strengths and vulnerabilities of high technology industry in the region.

WASHINGTON: A CENTENNIAL ATLAS by James W. Scott and Bruce C. Sarjeant. Western Washington University, Bellingham, WA 98225.

With the completion in fall 1989 of WASHINGTON: A CENTENNIAL ATLAS, the State of Washington now has its first-ever comprehensive atlas. The purpose of the atlas is to provide spatial and temporal overviews of Washington's cultural, demographic, economic, political and social evolution from the granting of statehood in 1889 to the present time. The approximately 360 maps are arranged in nine sections: the natural environment; population; settlement; resource industries; manufacturing; service industries; government; society; cultural achievements.

The atlas makes use of a variety of cartographic techniques, but colored choropleth maps providing information on the state's thirty-nine counties predominate. A unique feature of the atlas is the use of a sequence of four maps for most of the topics covered. The sequences usually begin with a map for 1889 (or 1890), continue with maps for 1920 and 1950, and end with a map for 1980 or a more recent year. Presidential and gubernatorial elections, however, are each covered in two dozen maps.

Displayed are a selection of the maps, together with brief textual commentary.

PRE-TELESCOPIC ORIENTAL SUNSPOT OBSERVATIONS AND VOLCANISM

by Louis A. Scuderi, Department of Geography, Boston University, Boston, MA. 02215.

Pre-telescopic sunspot records from the Orient often mention reductions in solar intensity. This effect may be related to observation of the solar disk near the horizon, or through fog, haze, and dust clouds. Similar enhanced observation of sunspots may be the result of attenuation of the solar beam by volcanic dust and aerosols in the stratosphere. Historical records from the Mediterranean, northern Europe and the Middle East frequently indicate the presence of 'dry' fogs following major volcanic eruptions. These fogs diminish solar intensity and increase hazy sky conditions. They are commonly associated with solar optical effects including halos, arcs, crosses, mock suns, and the appearance of shapes and figures on or surrounding the solar disk. A significant number of sunspot observations from the Orient include references to such effects. Historical Roman descriptions of the aerosol veils associated with sulfur-rich volcanic eruptions are similar to descriptions of 'sunspot' observations made at the same time in the Orient. They also occur simultaneously with proxy tree-ring evidence of large volcanic eruptions. Statistical analysis of Oriental sunspot observations described as 'vapours' or containing descriptions of other atmospheric effects show that these events are associated with atmospheric veiling resulting from global scale volcanic activity.

LANDSCAPE DYNAMICS AND ENVIRONMENTAL DEGRADATION

by Galina V. Sdasyuk, Institute of Geography, USSR Academy of Sciences

The study of landscape dynamics is one of the most important directions of geographers' participation in multidisciplinary research efforts that seek to explain the processes driving environmental degradation and search for alternative pathways leading to sustainable development. An evolutionary analysis indicates that the present-day landscapes form a heterochronous system with strong inherited features, a polarized structure, and a large degree of instability. Serial maps on Global Soil Cover, Land Use, Geomorphology, and "Geographical Belts and Zonal Types of Landscape" have been created at a scale of 1:15,000,000 and published in the USSR. They provide a framework to report on certain specified conditions and trends for the land surface classified into 96 landscapes. Each landscape with its special combination of physical, biological, and social processes presents unique problems, opportunities, and vulnerabilities to global change. One aspect of the changing world environment that commands systematic attention is the distribution of fragile ecosystems and critical environmental zones in need of urgent management improvement to avoid approaching the threshold of irreversible change and transform "red" data maps of landscape degradation into "green" maps of sustainable development.

CHURCH NAMES IN WESTERN PENNSYLVANIA

by Gail S. Sechrist
Indiana University of Pennsylvania, Indiana, Penna. 15705

This paper will complement an earlier study of church names in Pennsylvania and their relationship to the cultural, physical, and religious landscapes. Church names in Pennsylvania can be grouped into seven broad categories: physical features, local place names, descriptive names, religious persons, religious places, religious terms, and denominational names. Church names used in the study come from the Geographic Names Information System Data Base File that includes named features on U.S.G.S. topographic maps. Phone book and denominational listings of churches supplemented the GNIS data base and compensated for the large number of churches inside the urban areas that are not named on the topographic quadrangles. Denominational listings also provided additional statistics about the congregations.

An earlier case study of church names in Northampton and Lehigh Counties in eastern Pennsylvania revealed that religious person names were the most common in the two counties but that local place names, descriptive names, and physical features were more common in the rural areas of the counties.

This study of church names in the western counties of Indiana and Westmoreland revealed that there are some similarities with Northampton and Lehigh Counties, but that the local topography and cultural groups altered the patterns found.

TRACKING SOCIO-ECONOMIC CHANGE IN RURAL PENNSYLVANIA THROUGH THE MAIL

by Robert P. Sechrist, Dept. of Geog. & Planning, IUP, Indiana, Pa. 15705.

United States Postal Service data are used to track socio-economic change in rural Pennsylvania. Each month the Postal Service reports the number of residences and businesses that receive mail. Data are reported at the ZIP code level. These data are adjusted using median household size in each ZIP code to estimate monthly changes in current population. Business address counts are not adjusted to indicate employment levels, but rather, are used to indicate overall economic health in a ZIP code by calculating monthly percent change. Changes in numbers of residences and businesses are used to identify general multiplier effects and identify the loss or gain of major employers. Lag time in population change associated with the loss or gain of employers is also identified. Finally, characteristics of rural areas nearer Philadelphia and Pittsburgh are compared and contrasted to those more distant.

SNOWFALL IN NORTHERN ARIZONA, A SYNOPTIC CLIMATOLOGICAL APPROACH

by Randy F. Sedlacek, Arizona State University, Tempe, Arizona 85287-1508.

Relationships between snowfall and associated synoptic conditions were studied using Kalkstein's temporal synoptic index methodology. Daily meteorological data for 15 winter months covering the period from January 1980 through December 1985 were collected from the Flagstaff Airport.

The meteorological variables used in this study to define the air masses producing snowfall were air pressure, air temperature, dew point temperature, wind direction, and sky cover. The time period of the weather observations were 500, 1045, 1646, and 2300 hours local standard time.

The meteorological observations were subjected to Principal Component Analysis. Ward's method was used to group days with similar component scores into meteorologically homogeneous classes. The means of the meteorological variables for each of the classes were then calculated. The air mass types producing snowfall are described by their mean meteorological values.

ALONGSHORE SEDIMENT TRANSPORT: AN EMPIRICAL TEST OF EXISTING MODELS

Brian Greenwood, Departments of Geography and Geology and **Nurith Sela** Department of Geography, Scarborough Campus, University of Toronto, Canada.

Prediction of sediment transport rates alongshore in the surf zone on non-cohesive coasts is still poor, with order of magnitude estimates common. This inadequacy reflects a basic lack of understanding of the primary mechanics and hydrodynamics associated with sediment movement in this complex zone and thus an inability to parameterize the system successfully. For example, the role of wave groups and bedforms have not been adequately accounted for in alongshore transport modelling.

In this paper a series of field experiments are described in which colocated vertical arrays of electromagnetic flowmeters (Marsh-McBirney OEM 512's) and suspended solids sensors (Downing and Associates Optical Backscatterance Suspended Solids Sensors) are used to measure both the high frequency (4Hz) and time-averaged shore-parallel sediment flux across a surf zone dominated by non-saturated breakers. Non-marine and marine, fetch-restricted, barred environments and a marine, non-barred environment with a strong swell component are examined. In all cases a well developed grouminess was present in the incident wave field during high wave conditions, which was persistent across the surf zone. Bedforms varied over the time of the experiment. Simple comparisons of the integrated time-dependent sediment flux and the flux computed using time-averaged terms reveals the roles played by group structure and bedforms in the shore-parallel transport of at least the suspended load.

PUBLIC VALUES AND PARK PLANNING by J. L. Sell. University of Arizona, Tucson, Arizona 85721.

The recent development of a master plan for Oracle State Park in Southern Arizona provides an opportunity for the examination of public participation in innovative environmental planning. Oracle State Park is one of the first parks in Arizona to have environmental education, rather than recreation, as its primary mission. The planning process for the park included the use of geographic information system analysis as well as standard professional design practice. The park is also located at the edge of a small community noted for its interest in local environmental planning. This combination of factors provides an interesting backdrop for the examination of a public participation program in the planning of a protected natural environment. Discussion of techniques for eliciting, evaluating, and incorporating public values, as well as the problems associated with participatory approaches, lead to an examination of a process model for incorporating public values in environmental planning.

GAIA HYPOTHESIS AND GEOGRAPHICAL EDUCATION by Stuart Semple School of Education, Dalhousie University, Halifax, Nova Scotia, Canada B3H 3J5.

Attention is focussed on activity of the biota and consequent change in the context of urbanization. One way of presenting the evidence and issues is illustrated by a newly-developed curriculum in global geography, now being field-tested with young geographers at senior high school level, for which the basic text is GAIA: An Atlas of Planet Management.

MUSLIMS IN INDIA: RURAL-URBAN AND MALE-FEMALE RATIO VARIATION, Anindita Sen, The University of Akron, Akron, Ohio 44325-5005.

An analysis of the distribution of Muslims in India by 400 districts based on 1981 census data was made to assess the rural-urban and male-female variation. Comparison of chloropleth maps and application of Pearson's Correlation and t-test revealed that the Muslims in north-central India are more urban, compared to those of the districts bordering Bangladesh, where they are more rural. Compared to other religious groups, rural Muslims have a higher ratio of females to males. Causes for these differences are explained. Further studies show that the percent urban population of this minority religion is higher than the percent urban population of the major group, Hindu. These findings are analyzed in detail.

EROSIONAL IMPACT OF HIKERS, HORSES, OFF-ROAD BICYCLISTS, AND MOTORCYCLES ON MOUNTAIN TRAILS by Joseph P. Seney and John P. Wilson, Department of Earth Sciences, Montana State University, Bozeman, MT 59717

This study assesses the erosional impact of hikers, horses, motorcycles, and off-road bicycles on mountain trails. A total of 120 sample plots on existing trails in the Gallatin National Forest of southwestern Montana were examined. A modified Meeuwig drip-type rainfall simulator was used to reproduce natural rainstorm events and treatments consisting of 100 passes were applied to each of the sample plots, with measurements being made after 50 and 100 passes. This approach means that 12 sample plots (times 3 counting replicate plots) were established for each type of treatment (hiking, bicycling, horseback riding, motorcycling and the control or null treatment case) to represent two soil textural classes (a sandy clay and a silt loam), two antecendent soil moisture regimes (dry and pre-wetted soils), and two slope gradients (0-6 and 8-18 percent). Standard statistical techniques were employed in an attempt to explain: 1) runoff and soil losses in terms of the topographic, soils, vegetative, and human variables, and 2) soil compaction, runoff, and soil losses in terms of different types (hiking, bicycling, horse riding and motorcycling) and intensities of use (50 and 100 passes).

RESEARCH IN ENVIRONMENTAL MANAGEMENT AND PLANNING: three case studies

by Rafal Serafin and J. Gordon Nelson, School of Urban and Regional Planning, University of Waterloo, Ontario, Canada N2L 3G1, and R. W. Butler, Dept. of Geography, University of Western Ontario, Ontario, Canada.

In this paper, we examine three research programs which were designed to improve planning of large scale resource management or development projects (Nanticoke Industrial development, Shetland Oil development, and Grand River Basin management). These programs were all marked by a strong interest in environmental assessment, monitoring and mitigation which aimed to improve project implementation. The programs differed in how they addressed environmental change during and after project implementation, as well as in their initial conceptual and methodological assumptions. They also differed in their interaction with interest groups during project implementation, as well as in adapting to changing social, economic, political and environmental circumstances. Experience based on these case studies suggests the advantages of interactive and adaptive research programs in environmental management.

ORIGIN AND DIFFUSION OF ZYDECO MUSIC, Rocky Sexton and Robert Kuhlken, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, LA 70893.

Zydeco music is a unique blend of Afro-American and Afro-French traditions indigenous to southwest Louisiana. While directly related to traditional Cajun music, Zydeco has developed distinctive characteristics as a result of influence from black gospel, blues, and jazz. Within this cultural and historical context, the music serves as an important indicator of Black Creole culture and ethnic identity. Variations in rhythm, tempo, and instrumentation further define the stylistic differentiation. Where Cajun music typically retains the original fiddle, acoustic guitar, and triangle, Zydeco has dropped the fiddle in favor of heavier reliance on the accordion and scrubboard, and with electric guitars becoming standard.

From its origins amid the prairies of southwest Louisiana, Zydeco music has spread to several other areas of the country, particularly Texas and California. Such diffusion is not random, but is linked to outmigration of Black Creole families. While its role as a cultural trait is strongest in the core area, Zydeco music fulfills the same function elsewhere. The popularity of Zydeco is increasing, and may be attributed to commercial recording of the music, and the national and international tours of well-known musicians.

SOUTH ASIAN IMMIGRATION INTO LUTON, 1950-1980 by Derek Shanahan, Department of Geography, University of Minnesota, Minneapolis, Minnesota, 55455.

Little research has been carried out on the immigration experience of, what may be termed, medium sized towns in Britain. Since 1950 south Asian immigration into Luton has increased significantly, reflecting particular migration chains. While return migration is not evident, the migration experience has been age and sex specific. Here, the influx and subsequent dispersal of Indians, Pakistanis and Bangladeshis are described. Dispersal has been greatest for the Indians and least for the Bangladeshis. However, even for the Indians, the most dispersed group, ethnic clustering and segregation from other groups remains a prominent characteristic.

CHANNEL MIGRATION AND THE REGENERATION OF BALD CYPRESS IN WESTERN TENNESSEE by David Shankman, Department of Geography, University of Alabama, Tuscaloosa, AL 35487.

Channel migration is a major determinant of vegetation patterns in alluvial habitats of the Southeastern Coastal Plain. The purpose of this investigation is to determine the role of the movement of the active channel and the development of oxbow lakes in the regeneration and distribution of bald cypress (Taxodium distichum) in the Hatchie River floodplain of western Tennessee.

Cypress occurs in isolated arcuate stands in oxbows and meander scars. Colonization begins after the active channel cuts-off leaving an oxbow lake. Size and age data indicate cypress first establish along the margins of the lake and later colonize the interior as the lake fills in and new surfaces are exposed. Cypress will not regenerate in stands with a well developed forest canopy, and therefore only rarely occur on older surfaces.

The rate of lateral channel movement and the creation of oxbows will maintain cypress as a major component of the bottomland forests. However, most of the major streams in the lower Mississippi alluvial valley have been channelized. The maintenance of a straightened channel will exclude the creation of oxbows. Therefore, the primary regeneration mechanism for cypress no longer exists in many areas.

STEELTOWN TO SPACEWORLD? JAPAN'S HEAVY INDUSTRY RESTRUCTURING AND REGIONAL DEVELOPMENT by Philip Shapira, Regional Research Institute, West Virginia University, Morgantown, WV 26506

This paper examines the restructuring of steelmaking, shipbuilding and coalmining in Northern Kyushu, Japan. During the 1950s through to the 1970s, these industries played a critical role in propelling regional growth and providing a base for the rapid reconstruction and development of heavy industries in Japan. But, in recent years, Northern Kyushu's heavy industries have experienced declines in production and employment resulting from structural shifts in Japan's industrial structure, corporate restructuring strategies, and increased international competition.

Using material drawn from field research in Kitakyushu (Nippon Steel), Nagasaki (Mitsubishi Heavy Industries), and Omuta (Mitsui Coal), the paper explores the restructuring of Japanese heavy industries in Northern Kyushu, the impacts on workers and the region, and governmental roles in dealing with restructuring and promoting new economic development activities.

The changing fortunes of heavy industries in Northern Kyushu indicate that Japan is not immune from problems of restructuring that have hit older industrial regions in North America and Europe. The process of employment adjustment in Japan has been markedly different, in part because of the particular employment practices and subcontracting relationships associated with the large Japanese firms studied. However, like older industrial regions in other countries, Northern Kyushu still faces long-term problems of regional development.

SPATIAL ASPECTS OF PART-TIME EMPLOYMENT AND SELF-EMPLOYMENT IN CANADA by Bob Sharpe, Department of Geography, Wilfrid Laurier University, Waterloo, Ontario N2L 3C5.

This research provides a descriptive and exploratory analysis of the growing number of persons who work outside of paid full-time employment. In Canada this group, which includes the self-employed, part-time employees and unpaid family workers, comprise over 30% of the total labour force. Moreover the share of self-employed and part-time workers has grown consistently and rapidly since 1975. The spatial distributions of part-time and self-employed workers are analyzed using 1981 and 1986 Census data. Patterns of regional concentration among these workers are identified as well as changes in these patterns before and after the recession of the early 1980s. The characteristics of these workers are then examined in more detail using data recently released from Statistics Canada's Labour Market Activity Survey. This analysis focuses on the spatial mobility patterns of these workers as they shift among different forms of work and move from one local labour market to another. To what extent are these national patterns of part-time employment and self-employment the result of the immobility of labour, or the result of the movement of these workers from region to region?

LANDSCAPE DYNAMICS AND ECOLOGIC IMPLICATIONS IN LAND BETWEEN THE LAKES, KENTUCKY-TENNESSEE by D. M. Sharpe and Yang Zhao, Southern Illinois University, Carbondale, Illinois 62901.

Land Between the Lakes (LBL) is managed by the Tennessee Valley Authority as a multi-purpose area, from recreation to timber production. Increasingly, it is being developed as a major site for ecologic research, and is being considered for Biosphere Reserve status. The composition and structure of its forests, which impacts on all terrestrial and aquatic ecologic dynamics of LBL, results from a land use history that has been poorly documented. Forest management, designation as a Biosphere Reserve, and its potential as a research area require that land use history be reconstructed. Remote sensing and a geographic information system are combined to reconstruct 100 years of land use history for selected tracts in LBL. Aerial photography extends to 1926-27, with periodic overflights since then. Local records are used to extend the time series. Digital line graph data provide registration. Spatial analyses of landscape patterns and rates of land use change provide the spatio-temporal context for field studies at LBL by contributing to interpretation of site observations. Procedures used to develop and analyze the time series are discussed. The role of GIS in coordinating a multi-disciplinary research program is considered.

HOUSEHOLD INTERACTION AND ACTIVITY-BASED TRAVEL: SOME PRELIMINARY RESULTS by Allaire C. Shaw, The Ohio State University, Columbus, Ohio, 43210-1361.

Consumer travel is the culmination of complex spatial, temporal and interpersonal processes. The activity-based approach used in travel behavior research is a relatively recent framework developed to deal with the complex nature of urban travel. Individual activity patterns reflect broader activity programs of the household. While the importance of the interaction of household members on activity scheduling and travel behavior are acknowledged, only limited research has examined explicitly the interrelationships between travel patterns and trips undertaken for the purpose of serving passengers.

This research uses over 700 travel diaries from the Hamilton Travel Survey to analyze temporal variations and activity linkages associated with serve passenger trips. Results provide an enhanced view of trip generation and activity scheduling.

A GIS APPLICATION OF STUDYING A COMMUTER RAIL SYSTEM by Shih-Lung Shaw, Florida Atlantic University, University Tower, 220 SE Second Avenue, Fort Lauderdale, FL 33301.

Last January, the southeast Florida region started a commuter rail service, which extends from West Palm Beach to the Miami International Airport. The rail service is expected to serve as a maintenance-of-traffic measure while the major arterial (Interstate 95) is expanded. However, the ridership level of the commuter rail service has been constantly falling below its expected ridership level.

This paper uses a GIS to study the spatial distribution patterns of current riders of the rail system based on the data collected from an on-board questionnaire survey conducted in May 1989. In addition, the street network, the transit bus routes, and the rail feeder bus routes in Broward County (one of the three counties served by the commuter rail system) are entered into the GIS. By overlaying these coverages with the locations of the rail stations and by using a shortest-path algorithm, the accessibility levels of each of the rail stations to/from different areas in Broward County are computed for the auto travel mode and for the bus travel mode. The theoretical service areas of each of the rail stations are then defined accordingly. Suggestions of improving the rail accessibility to the major employment and activity centers in the county are made based on the analysis results.

DESIGN CONSIDERATIONS FOR AN ARTIFICIALLY INTELLIGENT NUMERICAL GENERALIZATION SYSTEM by K. Stuart Shea, The Analytical Sciences Corp., 12100 Sunset Hills Road, Reston, Virginia 22090.

The nature of cartographic generalization in a digital processing environment differs dramatically from the manual domain in the manifestation of its ideologies. Several key issues, some seemingly irresolvable because of our lack of understanding of the cognitive processes involved in successful manual generalization confront us now as we attempt to emulate this traditionally manual process using contemporary digital computers. The field of Artificial Intelligence (AI) offers exciting possibilities to assist us in this endeavor. The concept of an artificially intelligent numerical generalization system embodies methodologies which reflect the theoretical aspects of human intelligence and, as such, could closely mimic the human generalization process.

The purpose of this paper is fourfold: (1) to carefully document the differences in philosophy between Expert Systems (ES), Knowledge Base Systems (KBS) and Rule Base Systems (RBS) as they apply to numerical generalization; (2) to discuss the maturity of automated numerical generalization processing in light of the requirements of ES, KBS, and RBS; (3) to present a control strategy for a rule base generalization environment; and (4) to discuss possibilities for future research initiatives. The emphasis throughout the paper will lie on issues of implementing such systems.

THE MIDDLE ATLANTIC AREA'S CONTINUING CARE RETIREMENT VILLAGES

by Philip Shea, Department of Geography and Planning, and Jannie B. Shea, School of Home Economics, East Carolina University, Greenville, North Carolina, 27858.

This poster presents the distributional pattern of continuing care retirement "villages" situated in the Middle Atlantic area from Delaware to South Carolina. The information used in this survey was gathered from published trade lists and verified by on-site visits.

Continuing care retirement "villages" provide a popular alternative life style for today's older population. The contemporary family differs distinctively from its past traditional counterpart in terms of mobility, variation in family form, increasing emphasis on senior adult independence, and improved economic status. Today's middle class retiree seeks a living environment that offers social stimulation, scheduled cultural activities, and independence from the younger generation. Continuing care "villages" meet this demand. Such "villages" offer diverse living arrangements including apartments, townhouses, and individual detached homes all of which are designed to meet the changing health needs of older adults. Common facilities include a health care infirmary, a community dining hall, and recreational amenities such as tennis courts, game rooms, and a golf course. First achieving considerable popularity in Delaware, Maryland, and Virginia, such "villages" are now being constructed in increasing numbers in the Carolinas.

LOCAL CONTROL AND THE TERRITORIAL ORGANIZATION OF AMERICAN PUBLIC EDUCATION

by Fred M. Shelley, University of Iowa, Iowa City, Iowa 52242 and University of Southern California, Los Angeles, California 90089-0663, and David R. Reynolds, University of Iowa, Iowa City, Iowa 52242.

Throughout the course of American history, the concept of local control has played a major role in debates concerning the appropriate organization and provision of educational services. Although the idea of local control remains a cherished ideology, in fact control of American public education is not local. During the twentieth century, control of American public schooling was systematically assumed by an elite corps of professional educators whose decisions were ratified uncritically by state and Federal government officials. The concept of local control shifted into the realm of ideology, used by government officials and judges to justify a wide variety of controversial educational policies including school financing and racial integration. This paper focuses on the use of the ideology of local control in the delineation of school district boundaries and the assignment of pupils to schools and school districts. It considers important questions such as the role of local control in the school consolidation movement in the Middle West and in the desegregation of public education following the *Brown v. Board of Education* decision of 1954. The examples illustrate how the ideology of local control has been used to systematically uphold the state's interests in the organization of American schooling.

EVAPOTRANSPIRATION AND VEGETATION CHANGE IN CALIFORNIA'S CENTRAL VALLEY

by Marlyn L. Shelton, University of California, Davis, California 95616.

Spatial variability of evapotranspiration accounts for significant differences in energy and moisture balances linking the earth's surface and the atmosphere. Alteration of the natural soil-vegetation-climate system accompanies the elevated rates of evapotranspiration promoted by irrigation. The magnitude and spatial characteristics of pre-agricultural and post-irrigation evapotranspiration in the Central Valley are analyzed to assess changes in evapotranspiration as an agent of regional climate change.

The areas of 5 major vegetation types in the pre-agricultural landscape are determined by planimetering Kuchler's vegetation map of California. Area weighted evapotranspiration by native vegetation is calculated for 4 major subbasins and totals 36,204 hm^3. For post-irrigation conditions, an annual evapotranspiration flux of 27,700 hm^3 is computed using crop acreage and water use by individual crops. Surviving native vegetation contributes an additional 15,000 hm^3. The annual evapotranspiration increase of 18 percent attributed to irrigation is surprisingly small and is unlikely to result in a detectable climatic influence. Comparison of the 4 subbasins reveals that the majority of the altered evapotranspiration flux occurs in the northern and southern extremes of the valley.

THE CITY AS LOCUS OF PRODUCTION

by Eric Sheppard and Helga Leitner, Department of Geography, University of Minnesota, Minneapolis, MN 55455.

While much has been written about cities as arenas of collective consumption in the political economic literature, the treatment of cities as sites of commodity production has received more sporadic attention. Yet historically their growth and decline under capitalism hinges on their performance as agglomerations of commodity production. The location of commodity production within cities is correspondingly influential in structuring urban space, yet again has received little attention. This paper briefly reviews attempts to theorize the intra-urban location of commodity production in cities of industrialized capitalist societies.

The literature which exists on the location of commodity production within cities concentrates by and large on the location decision of capitalist entrepreneurs, or the demand they are hypothesized to have for a location. This literature can be classified by the degree to which theorists attempt to go beyond individualist accounts of this decision, towards placing it within the context of the evolving nature of production and labour relations under capitalism. In addition, given the shortage of open space in cities it is necessary to examine the process by which commercial and industrial real estate, the built environment for commodity production, is shaped and developed within cities. This represents the supply of the space necessary for commodity production, and itself is a commodity produced within cities in ways that depend on the urban land market, the supply of money for real estate investment and the spatial dynamics of the production of commercial and industrial buildings.

We conclude with a brief discussion of challenges to be overcome, to develop more complete conceptualizations of the intra-urban location of commodity production that are both grounded in the structural dynamics of capitalism and sensitive to both differences in context and the strategies of individual agents.

MODELING THE CAPITALIST SPACE ECONOMY: BRINGING SOCIETY AND SPACE BACK IN

by Eric Sheppard, Department of Geography, University of Minnesota, Minneapolis, MN 55455.

In economic geography, Marxist and political economic research has been dominated by analyses stressing the complex dialectical interdependencies and contradictions of capitalism. These provide a rich language for characterizing the evolution of a capitalist space economy, but provide few details about the spatial organization of capitalist production under certain given conditions. Analytical models in economic geography purport to give precise descriptions of the space economy, but are dominated by a neoclassical view that neglects the structures of society.

Beginning with some fundamental assumptions about the structure of capitalism, an analytical model is constructed from which some fundamental quantitative and qualitative properties of a space economy under full capitalist competition are deduced. These describe the location of commodity production, spatial gradients of prices, labour values and rents, and trading patterns of commodity flows between regions. Contrary to mainstream arguments, it is demonstrated that profits and wages are not, respectively, payments for the abstinence of capitalists and the efficiency of workers, but represent a distribution of income that cannot be divorced from social conditions and political struggle.

Furthermore, any equilibrium that might exist for such a space economy shows strong disequilibrating tendencies due to conflicts between classes and the difficulty of managing a multi-commodity economy using market mechanisms. Spatial differentiation increases the complexity of inter-class conflict and the likelihood of destructive intra-class conflict, because it contributes a degree of complexity and uncertainty that makes it increasingly difficult to conclude that self-interested behavior leads to individual or societal welfare. Implications can then be drawn concerning alternative views about the viability of market mechanisms for resolving societal conflicts. I describe briefly extensions to incorporate both the organizational structure of capitalism and capitalists' and workers' strategies for self-improvement, and discuss empirical application.

THE DEVELOPMENT OF CARTOGRAPHY AT WASHINGTON

by John C. Sherman, Department of Geography, University of Washington, Seattle, WA. 98195

Cartography at The University of Washington developed similarly to that at both Kansas and Wisconsin. In the early 1950s, both John Sherman, who had completed his Ph.D. at Washington in 1947, and Henry Leppard, who had moved from the geography department at The University of Chicago, established the cartography program. Soon, a distinguished group of graduate students came to study cartography at Washington, attracted by the strength of the program.

By 1953 the University of Washington had a series of six cartography courses in place, taught by both Sherman and Leppard. These included maps and map reading, introductory cartography, graphic techniques in the social sciences, intermediate cartography, and map reproduction. In the late 1950s Henry Leppard left Washington for UCLA and was replaced by Willis Heath, also a Washington Ph.D. Over the next three decades, Washington continued to be a center for cartographic training, producing approximately fifteen Ph.D.s in cartography. In 1969 Phillip Muehrcke, a new Ph.D. from the University of Michigan, was appointed on the faculty and, later, Carl Youngmann joined the department. Washington has continued its strength in cartography over the past thirty years with at least two full-time faculty and a cadre of graduate students.

SURVEYED BEHAVIORAL INTENT IN TRANSIT USAGE by Ira M. Sheskin, University of Miami, Coral Gables, FL 33124

Most transportation surveys ask a battery of questions concerning *attitudes* toward transportation, *attributes* of respondents, *and travel behavior*. Models are then used to relate attitudes and attributes to travel behavior to predict travel demand. The results of two surveys are reported in this paper which test the extent to which respondents can be asked their transit choice directly. A *pre-transit* survey was conducted in 1983, just prior to the opening of Miami's Metrorail. The *post-transit* survey was conducted in 1987.

Ridership projections for Metrorail indicated that as many as 202,000 riders might use the system daily. Thus, the University of Miami planned to undertake improvements in the area adjacent to University Station. Because of the significant expenditures involved in these plans, a *pre-transit* survey was undertaken in April, 1983 of administrators, faculty, staff, and students to discern the probability that each group would take Metrorail to campus. The overall conclusion from this study was that almost 6000 persons expressed an intention to access campus using Metrorail on a daily basis, with an additional 2000 intending to use the system during the mid-day.

In 1987, an intercept survey (the *post-transit* survey) was conducted at the University of Miami Metrorail station. Approximately 313 interviews were completed. The results of the *post-transit* survey indicate that many fewer persons were actually using Metrorail than the pre-transit survey had predicted.

FRONTIER SQUATTER SETTLEMENT AND PRODUCTION RELATIONS: THE CASE OF NEPAL TARAI by Nanda R. Shrestha, Department of Geography, University of Wisconsin-Whitewater, Whitewater, WI 53190.

In the past 30 years Nepal's Tarai frontier has experienced a growing influx of hill migrants searching mainly for land, probably the most important source of survival as well as social status and economic power in agrarian societies like Nepal. As such, land plays a central role in the ecodemographic as well as sociodemographic relations of production and hence people's class position or economic viability. While the ecodemographic relations concern the physical accessibility to land and production technology (i.e. human-nature relations), the sociodemographic relations define social land accessibility or control (i.e. human-human relations in the process of production). Since many migrants have failed to own land through formal channels or have access to it on a rental or sharecropping basis at the frontier, they have resorted to what is commonly known as "squatter or spontaneous settlement" as a mode of land acquisition. Its fundamental objective is to occupy a piece of land and turn it into a source of income (survival asset). Squatter settlement can thus be viewed as a form of social movement among landless hill migrants as it involves an unauthorized occupation of public land (e.g. forest fringes). While, as a social movement, squatter settlement has both ecological and political repercussions, the important question is: can it lead to improvements in migrants' socioeconomic viability? Based on survey data as well as personal observations, I will discuss the nature and process of squatter settlement and its role in the ecodemographic and sociodemographic relations of production.

MASS- MOVEMENT SEDIMENTATION IN SNAKE RIVER DRAINAGE BASIN AND YELLOWSTONE FIRES by John F. Shroder, Jr., Department of Geography-Geology, University of Nebraska at Omaha, Omaha, NE 68182; Richard A. Marston, Department of Geography and Recreation, University of Wyoming, Laramie, WY 82071; and James Schmitt, Department of Earth Sciences, Montana State University, Bozeman, MT 59717.

Fine-grained friable sedimentary rocks overlain by massive clastics and volcanic flow rocks are common in Teton Wilderness and southern Yellowstone National Park. Deglaciation, climate fluctuation, and fluvial erosion of these unstable lithologies by the Snake River and tributaries have produced many slope failures. Tree-ring dating and methodology adapted from Environmental Protection Agency allowed estimates of mass-movement sediment delivery in burned and unburned sites. Broad delineation of formerly or potentially unstable areas preceded identification and mapping of mass movement types. Identification and weighting of associated site characteristics included measures of gradient, vegetative indicators, subsurface drainage, soil texture, bedding structure and orientation, slope configuration, and precipitation. Weighting factors for determination of fire-induced slope failure hazard included three levels of soil heating and intensity. Sediment delivery was estimated from rivers in the Huck, Mink, and Emerald Creek burned areas as well as from the unburned areas. In general the existing larger slope failures were little affected by fire-induced sedimentation changes because: (1) they are large and deep seated; (2) their common open terrain has few trees to burn; (3) typical hummocky topography retains moist ground that resists burning; (3) low-fuel producing Populus tremuloides dominates in such terrain instead of flammable conifers; (4) broken topography provides natural firebreaks; and (5) linear flow topography tends to train fires up along ridge lines and out of slope-failure zones.

THE CHANGING DEMOGRAPHIC CHARACTERISTICS OF THE NAVAJO NATION by J. Matthew Shumway, Indiana University, 319 Kirkwood Hall, Bloomington, IN 47405.

Recent growth of Native American populations has encouraged a growing number of inquires into the changing demographic characteristics of this group. These inquires have examined various aspects of the causes and consequences of changing Native American demography. One of the important aspects of the study of Native Americans is the inherent variations among tribes and tribal locations. Because of this, it becomes difficult to generalize general patterns and processes to specific tribes. Therefore it is important to understand both the exogenous forces and the local or "unique" characteristics which, when they interact, combine to create the observed patterns. The purpose of this paper is to examine these determinants in relation to the changing demographic characteristics of the Navajo Tribe. The Navajo were chosen because they are the largest American Indian Tribe and their growth rate in recent years of around 2.8 percent is one of the fastest growth rates of any population group in the U.S. A comparison of Navajo to total U.S. demographic characteristics will provide additional information on the processes and patterns affecting Navajo demography. Implications of past and present Navajo population growth will also be examined.

* * *

FISHING AND FISHERIES ALONG THE PAKISTAN COAST by Akhtar Husain Siddiqi, Professor of Geography, Indiana State University, Terrre Haute, IN 47809.

The study aims to find the extent to which Pakistan has been beneficial by the International cooperation in fishery developed in determining its fishery resources. Secondly, it also discusses whether small-scale operations in Pakistan were able to obtain services and general access to facilities they lacked in the past. In this connection it is also worth noting whether they have succeeded on their own in establishing some organizational structure to achieve the development objects. This survey will also cover development status and targets, as defined in the national planning of Pakistan, and focuses on local capital, skills and future needs of fishermen in Pakistan.

District Level Locational Strategies in Sierra Leone by M. Silberfein, Department of Geography and Urban Studies, Temple University, Philadelphia, PA 19122.

This paper will look at a rural region in Sierra Leone from the perspective of improving the distribution of goods, services and employment opportunities. Currently, national plans contain rhetoric on focal point strategies and the needs of isolated rural communities, but actual projects are designed as if location were irrelevant. One issue in particular will be the focus of attention in this overview: the identification of alternative intervention sites for rural development below the level of the district center, particularly small towns (3000-7000 persons) and large villages.

An initial assessment of the situation can be made based on field work and subsequent examination of documents. There is an official policy in Sierra Leone that calls for rigorous spatial planning and the spreading out of investment but there is effective resistence to this policy on the part of the political leadership. In effect, many areas have been experiencing a downward slide characterized by decreasing access to the national system. There are, however, a few example of decentralization that may lend themselves to more widespread application. These include the mini-market concept, dispersed crop nurseries and localized training for birth attendants. Yet, without a more serious commitment, changes will emerge at a tediously slow rate.

FUTURE BRAZILIAN ECO-DEMOGRAPHIC GROWTH, LAND DEMAND, AND DEFORESTATION IN AMAZONIA

by Arthur L. Silvers and Marvin Waterstone, Univ. of Arizona

Deforestation in the Brazilian Amazon has been partly the result of governmental tax incentives that encouraged large-scale corporate investment in Amazonian land for agricultural use, partly the result of migrating labor displaced from south-central soybean farms, and partly other causes. These pressures may be mitigated with tax reform and information concerning low Amazonian land productivity. But continuing patterns of eco-demographic growth in Brazil will yield continuing pressure on demand for lands for agricultural output, while continuing patterns of income inequality and population growth imply continued population pressure on lands for subsistance agriculture.

In this paper, the effects of interregional migration to the Amazon region is decomposed into push (displaced labor) versus pull (labor demand) components, and similarly with regard to interregional investment. The impact of the autonomous components of these supply shifts upon the demand for Amazonian land are considered relative to the continuing growth of domestic Brazilian demand for agricultural output. Implications of these future patterns on the demand for agricultural land and consequent deforestation of the Amazon are then considered.

CONFEDERACY IN BALTIMORE: A CASE AGAINST FRAGMENTED DEVELOPMENT CONTROL by Stuart Simpson, Graduate Student, Department of Geography, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061

The City of Baltimore, Maryland has been described by politicians, planners, and urban geographers as a "miracle" of the developmental planning process. It achieved this lofty consideration through the capture of copious amounts of federal, state, and local development and re-development dollars, and through innovative planning tactics. Businesses and developers were lured into reinvesting in the CBD's future through the creation of a "positive" development atmosphere. At the center of the planning process, a confederation of quasi-public development corporations with strict geographic territories competed for development money and businesses.

Through analysis of documents, destinations of development monies, interviews with officials, and maps, evidence has emerged that points to structural flaws in the re-development process that the quasi-public corporations were a part of. Changes in the urban landscape of Baltimore have been wrought through the actions of these quasi-public corporations. The fragmentation of development control permitted divergence from stated priorities and goals, causing waste and systematic neglect of areas inside and outside of their boundaries. This paper provides an alternate view of the condition of Baltimore's CBD, and helps us understand the effects of fragmented development control.

CAN GEOGRAPHERS IN THE USA AND CANADA CONTRIBUTE TO PEACE? ONE SUGGESTION IN THE PAST; ONE CHALLENGE FOR THE PRESENT by O.F.G. Sitwell, Department of Geography, University of Alberta, Edmonton, Alberta, T6G 2H4

Before Jedidiah Morse published his well-known American Geography, another American, Robert Davidson published Geography Epitomized. This was an elementary schoolbook; it was methodologically innovative, being written in verse, "for the sake of the memory". A British edition in 1787 was addressed to students in the British colonies in North America; its editor recommended geography because "it knows no party in politics, it scorns all the quarrels of kingdoms and states", and Davidson as an "excellent teacher of geography", his nationality being no barrier to British respect.

I shall divide my paper into three parts. In the first I shall review the contents of Davidson's book with a view to establishing, or questioning the grounds for this high praise. I shall also set the book in the context of its time, and compare it with other geography schoolbooks of that era.

In the second part I shall review current work published by North American geographers, with a view to seeing what signs there are that contemporary professional geographers look on their subject as one that aids their students acquire a universalist outlook. As part of this review I shall note the differences I have found between American and Canadian geographers in this respect.

Finally, I shall sketch a pedagogical framework that would make it easier for geographers to foster a universalist outlook.

THE CLIMATICALLY OPTIMAL MAJOR LEAGUE BASEBALL SEASON IN NORTH AMERICA by Brent R. Skeeter, Department of Geography and Regional Planning, Salisbury State University, Salisbury, Maryland 21801.

Mean daily temperature data are analyzed for the 15 coolest cities which have major league baseball teams and do not have domed stadiums. The temperature data are used to determine the optimal (warmest) portion of the year for the baseball season to be held. These data, along with several additional climatic variables, indicate that from an entirely climatic viewpoint the major league baseball season should begin and end somewhat later in the year than is presently the case. Some possible implications of such a shift are discussed.

A HISTORICAL TOPOGRAPHIC SEQUENCE IN THE SELE PLAIN, CAMPANIA, ITALY by Mikels Skele and William I. Woods, Southern Illinois University at Edwardsville, Contract Archaeology, Box 1458, Edwardsville, IL 62026

The coastal topography of the deltaic plain of the Sele River in classical antiquity has long been a matter of controversy. The position of the ancient coastline relative to Greek sites south of the river, Etruscan sites north of the river and Italic sites on both sides is central to the interpretation of these settlements. References in classical literature are vague and often contradictory on this point, and the physical record has yet to be adequately explored.

A series of maps from various sources dating from the early sixteenth through the nineteenth centuries AD depicts the coastline approximately every forty years during that span. Although not directly relevant to classical antiquity, the sequence reveals major changes in the coastline north of the Sele River, while the southern half of the plain remains relatively stable. The accuracy of the maps on this point is verifiable through examination of internal evidence and by comparison with each other. Modern toponymic and geological evidence is also used to corroborate the interpretation.

As a result of this analysis a much more focused research design for geomorphological and sedementological investigations is possible.

Distinguished Lectures in the Historical Geography of Social Change, I. Regional Systems and Historical Social Science: Modern China: Spatial Systems and Social Process by G. William Skinner, Professor of Anthropology, University of California-Davis, Davis, California, 95616.

This is the first of two distinguished lectures to be presented by the eminent anthropologist, Professor G. William Skinner. This lecture constitutes a review and synthesis of Skinner's exceptionally rich scholarship on Chinese society viewed consistently from the perspective of central place structures, the core-periphery structuring of macroregional systems, ecological zones, and long-run historical change. These ideas, in addition to illuminating Chinese society, form the foundation for Skinner's comparative examination of agrarian societies in China, Japan, and France which is the subject for his second lecture. Commenting upon this lecture is Professor Marwyn Samuels of Syracuse University. The Lecture Series is sponsored by the Historical Geography Specialty Group and the China Specialty Group.

MODELLING OF FIRE BEHAVIOR IN STEEP TERRAIN by Mary Skopec, University of Iowa, Iowa City, Iowa 52242

The ability to predict fire behavior parameters such as rate-of-spread, heat release, and fire residence time is vitally important in areas of steep terrain where fire may contribute to the development of hillslope instability and debris flows. Enhanced erosion following a fire can be attributed to the development of a hydrophobic layer within the soil and removal of the vegetative cover.

Computer simulation models are one method for estimating the spread and intensity of fires and their subsequent impacts on hillslope erosion. Simulation models that describe fire behavior have typically required level or nearly level terrain as an operating assumption. While equations for the movement of fire on a level slope have been defined and empirically verified, these equations are not applicable in steep slope environments because of increased contact between flame front and fuel bed.

A physically-based model, FIREMODS, was modified to capture the interaction between the flame front and fuel bed on steep slopes. This is accomplished by replacing an empirically derived slope coefficient with mass transfer equations that predict radiative heating as a function of slope. The increases in radiative heat transfer accelerate the vaporization of fuel bed moisture and pyrolysis. This in turn directly impacts fire intensity, heat release, and residence time. These parameters may then be used in an erosion model for high energy environments.

IN OTHER REGIONS: TERRITORIAL POLITICS AT THE PERIPHERY by David Slater, CEDLA, University of Amsterdam, Keizersgracht 395-397, 1016EK AMSTERDAM, The Netherlands.

The paper opens with a brief survey of the divergent currents of interpretation that are to be found in the literature on Third World regional and urban development. This is followed by a longer discussion of spatiality and political theory, within which the status and deployment of spatial concepts, tendencies of econocentric analysis, and issues of scale are variously considered. The major focus however falls on the problem of universalism and its varying modalities in urban and regional research. In contrast with other fields of analysis in the social sciences the geographical and related literature has so far not been an arena for debates on Eurocentrism in theoretical discourse. One finds in fact, that in the urban and regional domain, not only are the theoretical lines linked to a self-contained version of Western development, but also those lines and the research agendas that stem from them often presume to represent the universal when they are frequently highly particular. In the contemporary period with the growing interest in conceptions of postmodernity it is important to see to what extent and in what ways do discussions of the breakdown of 'meta-narratives' impinge on the realities of the periphery... and vice-versa.

THE EFFECT OF FLOODPLAIN MANAGEMENT ON PROPERTY VALUE by Robert S. Bednarz and Susan C. Slowey, Department of Geography, Texas A&M University, College Station, TX 77843-3147.

Increased urbanization in America has forced residential developers to build houses where there is land available, often in hazardous areas. Floodplains are popular areas for residential development. The aesthetic appeal of tall trees and rolling terrain attracts developers and home owners. Often, developers and home owners either fail to recognize the threat of flooding in these areas, or they do not perceive the threat to be of real importance. Whatever the reason, increased development in floodplains results in millions of dollars of losses each year.

Previous studies in the Bryan/College Station area demonstrate that location of residential property within the floodplain affects property values. This study will focus on the differences between residential property values along the floodplains in Bryan and College Station. These two jurisdictions, which make up the Bryan/College Station SMA, take significantly different approaches to managing their floodplains. These differences are described, analyzed, and their impact on floodplain property values is explained.

THE TREETHROW ROOTPLATE DISINTEGRATION/MOUND EROSION MODEL by Thomas W. Small, Frostburg State University, Frostburg, MD 21532-1099.

Rootplates and mounds formed by the tree uprooting process in Potter County, Pennsylvania, were examined to assess annual rates of surficial erosion. As the intact, elevated rootmass ("rootplate") begins to decay, rainsplash erosion and the slumping of soil/rock material once tightly held begins and causes mound formation. Through time, the bole and rootmass eventually disappear from the forest floor and only the mound remains as surficial evidence of where a tree once stood. Copper wire pins 22.9 cm (9") long were installed on rootplates and mounds of varying ages, ranging from less than two years old (rootmass still intact) to greater than 15 years old (rootmass mostly gone, wood barely identifiable). Both resinous and non-resinous tree specie rootplate/mound complexes were pinned. Four years of measurements of erosion rates at these sites range from 0.0 cm/yr (less than five year old treethrow, heavily vegetated, resinous specie and low, non-woody, grassed mound of presumed lengthy, but undetermined age) to 19.1 cm/yr (mounds of 13 to 16 years of age, non-resinous, unvegetated, major rootplate disintegration). In addition, a rootplate/mound photographed in 1950, 1952, and 1963, by C.S. Denny and J.C. Goodlett was rediscovered in 1989 and again photographed using the earlier consistent perspectives. Measured erosion rates and photographic evidence indicate that erosion on rootplates increases with rootplate disintegration/mound formation, before gradually decreasing with progressive lowering of the mound surface. Erosion rate site-to-site variance appears to be related to vegetated state of the mound, surface armoring by large clasts, whether the tree specie is resinous or non-resinous, and pin position on the mound (upper position on rootplate/mound with higher rates, lower pin placements with lesser erosion and sometimes cumulization).

MOBILITY, COMMUNITY AND CLASS IN SCOTTISH MINING SETTLEMENTS, 1870-1900. by Laura Smethurst, Department of Geography, University of Edinburgh, Edinburgh EH8 9XP, Scotland.

This paper examines rates of mobility within mining settlements in central Lanarkshire, Scotland, during the latter half of the nineteenth century. Characteristic of many firms operating in this region was the provision of dwellings for the workforce. Housing was provided for a variety of social and economic reasons, with differing degrees of success. It has been argued that one result was the projection of the relationship between capital and labour from the workplace to the home. In addition, through this ownership of housing, the company had the potential to determine both the social and spatial form of the mining community. Census data and a rent book of company housing are analysed to assess the stability of inhabitancy of the dwellings. Attention focuses on the relationship between persistence rates, occupational position and the spatial structure of the villages. This raises questions concerning the nature of 'community' in nineteenth century mining settlements and its role in class formation.

THE NEW "CITY IN THE EAST": THE STATE AND GENTRIFICATION IN LONDON'S DOCKLANDS by A. Smith, Department of Geography, University of Kentucky, Lexington, Kentucky 40506.

During the 1980s the Docklands in London have undergone a profound economic, social and political restructuring. The attempt to create this new "city in theEast" embodies many contemporary aspects of urban change in the United Kingdom; not least of these is how residential change relates to broader social change. Indeed, one of the primary processes involved in this transformation has been that of gentrification. This paper examines the role of the state, through the London Docklands Development Corporation (LDDC), in the gentrification of the Docklands. Firstly, the question of how and why the LDDC emerged as the primary 'mediator' of urban change in this locality is addressed. The socio-spatial constitution of the state is examined in the context of restructured urban-political relations in the United Kingdom. Secondly, it is argued that the state has had both an 'economic' and a 'political' role in the gentrification process. The state has subsidised the production of a gentrified built environment through the direct provision of capital investment on specific housing sites and in general infrastructure improvements. Additionally, the state has attempted to legitimise this investment and the inequalities arising from gentrification through a variety of political, ideological and socio-cultural means. These, however, are not without their limitations and contradictions, and an attempt is made to draw out some of these complex aspects. Finally, some of the implications for an analysis of the state in the gentrification process are addressed.

UNIVERSAL GEOGRAPHIES OF MORSE (1784) AND GOODRICH (1842): A COMPARISON by B. A. Smith, Kansas State University, Manhattan, Kansas 66506

Samuel G. Goodrich was one of America's second generation geographers and one of the most prolific geography textbook writers to date (Vining & Smith, 1989). In his autobiography (Vol. I, 1856) he referred to the universal geography of the Father of American geography, Jedidiah Morse, as "...the mammoth monument of American learning and genius of that age and generation" (p.143). That statement led to questions: What is the content of Morse's Universal Geography and how did it affect the content of Goodrich's Universal Geography? This paper assesses those two texts.

Assessment of the texts was done with the aid of the NCGE textbook evaluation form and an analysis of early American geography textbooks done by Sahli (1941).

Analysis of the Morse and Goodrich geographies turned out to be a study of contrasts. Both volumes are bound in leather, written in English, and both are regional in organization. Morse's text has 432 pages and the Goodrich text has 1008 pages. Morse's writing style was clinical whereas the style of Goodrich was more that of a travel agent. The Morse text has one map of the world and one map of the United States, a few tables, but no engravings. The Goodrich text has 39 maps, 129 tables, and over 900 engravings. Goodrich saw the use of graphics as vital to the content of his geography.

THIS CENTURY OF CITIES by Everett G. Smith, Jr., Department of Geography, University of Oregon, Eugene, Oregon 97403.

This year and next (1990 and 1991) mark times again for regular censuses in over forty nation-states. Numbers and locations of people in these places, when announced, and publication of population estimates for countries without periodic head counts will show unprecedented concentrations of people in expanding patterns of cities. Population estimates for urban areas throughout the world this year (1990) reveal more than 2,500 sites where at least 100,000 people congregate and call home. At mid-century little more than one-third as many locations, 955 in all, contained population concentrations exceeding 100,000, while at the beginning of this century, a mere 310 sites around the world had cities where this many people and more lived. World and regional maps document this dramatic transformation of the human population in the twentieth century. Evidence discloses discrepancies in estimating sizes of cities. In addition, the sheer magnitude of 350 locations, each with over one million human inhabitants, suggests an unparalleled personal detachment from natural environments and apparent division into many separate metropolitan worlds in a real world that is seamless, interconnected and increasingly fragile.

BEHAVIORAL CONSTRUCTS OF URBAN ELDERLY CONSUMERS by G.C. Smith, University of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada.

This paper reports an empirical analysis of how elderly consumers cognize and appraise urban shopping centers. Attention is focussed on two behavioral constructs: (i) information field; and (ii) evaluative criteria. An "information field" comprises the spatial knowledge that a consumer possesses about shopping centers in a city, while "evaluative criteria" are retail attributes used to assess alternative outlets. Together, these constructs are used as a basis for consumer spatial decision-making.

The data are obtained from a questionnaire/interview survey of samples of ambulatory elderly shoppers domiciled in three residential areas of Winnipeg, Manitoba, with contrasting shopping opportunities: (i) the central area; (ii) an inner suburb; and (iii) an outer suburb. The results disclose that the information fields of most consumers in each sample are spatially restricted. Thus, the older consumer's shopping decisions are typically made on the basis of limited knowledge of retail alternatives.

To determine the relative importance of the criteria used by elderly consumers to evaluate shopping centers, a resistance-to-change experiment was performed on seventeen retail attributes. The results indicate that the three elderly samples all identify "distance from home", "price", and "provision of grocery supermarket" as the most important attributes. However, the levels of importance assigned to eight of the other attributes vary significantly among the samples. To conclude, the theoretical and policy-making implications of the findings are discussed.

WASTED ENERGY: THE VICTORIA HOSPITAL EFW FACILITY by L.G. Smith, Department of Geography, University of Western Ontario, London, Ontario, N6A 5C2

Deficient impact monitoring and inadequate impact mitigation are recurring weaknesses in Canadian impact assessments. Both elements are crucial to effective impact assessment, yet both are largely absent from provisions for impact assessment in Canada and receive cursory attention at best in most impact statements. This paper examines the need to improve impact monitoring and mitigation through the use of a case study: an Energy From Waste (EFW) plant at Victoria Hospital in London, Ontario.

The Victoria Hospital EFW was the first such private facility in Ontario to submit to an impact assessment. The EFW proposal and eventual construction attracted much attention and considerable local controversy. Yet there have been no attempts to monitor nor mitigate public concerns arising from the completion and subsequent operations of the facility.

The results indicate that public concerns have remained those that existed when the EFW facility was first proposed. Principal among these is a fear concerning air pollution. Rather than dismiss the findings as purely a NIMBY reaction, further analysis demonstrates that these concerns are a function of uncertainty: an uncertainty that arises from a lack of information, a lack of involvement and a sense of inconsequence applied to local opinion. Indeed, the results suggest that the local public does not oppose EFW, they just are afraid of it in their neighbourhood because they have not been adequately informed nor involved. These findings underscore the need for monitoring of public concerns and highlight the need for mitigative measures beyond that of financial compensation if waste management is to gain wide public acceptance.

THE M-PROJECT: ISAIAH BOWMAN AND REFUGEE RESETTLEMENT, 1938-1944. Neil Smith, Rutgers University, New Brunswick NJ 08903.

In June 1933, Isaiah Bowman, then Director of the American Geographical Society, received an urgent plea on behalf of Karl Wittfogel, a corresponding member of the AGS. A member of the German Communist Party, Wittfogel was incarcerated in Dachau by the newly empwered Nazi government. Bowman refused to intervene on the grounds that neither he nor the Society were in the habit of supporting communists. Bowman's inaction was to become a habitual response. On the basis of his research on the "pioneering fringe," Bowman was contacted shortly after the "Kristallnacht" (November 9 1938) by FDR who requested that Bowman organize a top-secret study of resettlement possibilities for European refugees. The concentration camps that had initially been built for communists, gays, Gypsies and political opponents were now increasingly filled with Jews. Like the various parallel resettlement efforts, both private and public, Bowman organized a coterie of geographers and others to produce extensive surveys and reports of potential resettlement sites, mostly in Latin America and the African continent, but the M-Project led to the actual resettlement of only several thousand people. This paper investigates the rationale of the M-Project, Bowman's involvement, and the reasons for its ineffectiveness.

AMAZONIA by Nigel J.H. Smith, University of Florida - Gainesville.

Development pressures are triggering rapid ecological, cultural, and economic changes in Amazonia, one of the world's largest remaining forest frontiers. Some of the environmental effects of development schemes and spontaneous settlement have regional, and potentially global, implications. Ecological issues surrounding deforestation include soil erosion, adverse changes in soil structure and fertility, shifts in rainfall patterns, and loss of biodiversity, particularly genetic resources. Occupation of Amazonia, however, does not necessarily provoke ecological downward spirals. The cultural and ecological heterogeneity of the region has resulted in a mosaic of land use systems, some of them highly productive and sustainable. This study examines the regional and global impacts of land use practices in Amazonia. Pressures on Amazonian resources are identified and responses to perceived environmental degradation are highlighted. A major focus of the study will be the sustainability of farming operations, both small and large scale. In spite of considerable media focus on some highly destructive and wasteful land use practices in Amazonia, many positive developments are underway, such as an agricultural revival in the Bragantina zone east of Belém where cash-cropping with perennials, such as passion fruit and Barbados cherry, is breathing new life into an area once thought to be at the terminal stages of slash-and-burn farming. A focus on farming successes, as well as an indication of particularly fragile areas and unsustainable land use practices, will provide useful information for policymakers.

LEISURE ACTIVITIES AND THE GEOGRAPHY OF AN AREA: SELECTED EXAMPLES by R.V. Smith, Department of Geography, Miami University, Oxford, Ohio 45056.

The importance of leisure time activities, resources, and facilities in considering the geography of an area has rarely been documented or analyzed. It is clear that activities such as indoor and outdoor recreation, sport, and tourism occupy substantial land areas, create many jobs, generate considerable taxes, occupy a meaningful proportion of many peoples' available discretionary time and have other direct effects as well. In addition, the developments associated with this set of activities assist in creating an attractive or unattractive set of locational considerations for those seeking a site for a new facility, office, or plant. This paper contends that the full range of implications of leisure time activities and facilities is not understood or appreciated and that by almost any measure such uses and impacts are of central importance and concern. Illustrative examples are presented using selected Ohio cities and counties.

SOUTHERNERS RULE U.K.? GEOGRAPHIC ANALYSIS OF SUCCESS IN THE ENGLISH FOOTBALL LEAGUE 1921-1987, by A. M. Snook and P. R. Waylen, Department of Geography, University of Florida, Gainesville, Florida, 32611.

Success in sporting fields has been used as an indicator of a variety of cultural, social and economic activity, but few studies have established objective measures of this variable. Membership of the Football League has remained reasonably constant from 1921 to 1987. During this period there has been a shift in the geographic location of the more successful teams. Various techniques are employed to determine the nature of this shifting pattern and to measure their statistical significance. Analyses are carried out at the level of the entire League, Division and by Sports Council Regions. There is every indication of increased success of clubs from the Southwest and declining fortunes in the North, Northwest and Yorkshire and Humberside. It is proposed that, although these trends may suggest changing social attitudes and reflect economic conditions, the history of the League and its internal structure should be considered an integral part of future discussion.

INFORMING THE PUBLIC: LOW-LEVEL RADIOACTIVE WASTE DISPOSAL SITE SELECTION IN NEW YORK STATE by Richard A. Snyder, Roy F. Weston, Inc., Seattle, WA 98119.

A site must be selected for construction of a low-level radioactive waste disposal facility in New York State. Complementing site selection activities is an extensive public information and participation campaign designed to incourage input from local governments and citizens. The various outreach activities that have been implemented to date include work with a statewide citizens' advisory committee, review of siting reports, public meetings and workshops, creation of local task forces, and various informal speaking engagements. Participation levels, as well as lessons learned from each activity, will be discussed.

TERRORIST ACTIVITIES AND THE LANDSCAPE by A. Sofer, University of Haifa, Haifa 31999, Israel.

With the increase in terrorist acts all over the world, particularly in the past two decades, states,companies, and individuals have been taking action to prevent these acts. The result has been the development of an anti-terrorist security landscape in sensitive regions.

This landscape manifests itself chiefly in focussed form, but also spatially. The intensity of the landscape depends on the number of terrorist acts, on the targets of the terror (hitting at the state, at all residents, at certain groups or individuals), on the nature of the act (kidnapping-hijacking, murder, robbery, destruction), and on the kind of means employed (conventional weapons, poison, missiles, etc.).

Attacking airplanes created a landscape that characterizes air fields, the use of booby-trapped cars led to a barrier landscape, hitting at the general population brought about the phenomenon of security pits, checking at entrances to public buildings, fencing, preparing the public and establishing of special terrorist-fighting units. All these have landscape implications.

This landscape overlaps in part protective action against criminals, in part military activity, and in part also protection against economic espionage. Nevertheless, the elements related to terror stand out.

POSTMODERN GEOGRAPHIES AND THE CRITIQUE OF HISTORICISM by *Edward W. Soja*, Graduate School of Architecture and Urban Planning, UCLA, Los Angeles, CA 90024

This paper develops further the critique of historicism that is contained in my New Models in Geography chapter, "Modern Geography, Western Marxism, and the Restructuring of Critical Social Theory." Historicism, defined as the privileging of historical vs. geographical modes of explanation and interpretation, has dominated critical social thought for at least the past century. Despite the recent development of a critical human geography and a more balanced historico-geographical materialism, a lingering historicism continues to annihilate space with time, to subordinate the geographical to the historical imagination, and to deflect the impact of the growing reassertion of space in contemporary social thought and critical discourse. A more forceful and direct critique of historicism must be launched if the "new models" are to have any effect beyond the introverted disciplinary cocoon of Modern Geography.

ACUTE CHEMICAL SPILLS AND THE HAZARDOUSNESS OF RURAL PLACES by Williams D. Solecki, Department of Geography, Rutgers University, New Brunswick, NJ 08903

This paper describes and explains the spatial pattern of airborne acute toxic hazards in rural areas of the United States. The hazardousness of a place is defined by the levels of risk and emergency response capability present. Data on chemical spills, response capability and socio-economic measures were collected for the non-metropolitan counties in four representative states: Alabama, Georgia, Iowa and New York. These were augmented by information from interviews with local and state officials. Inter- and intra-state comparisons of the levels of risk and response capability were made.

The analysis indicates that there is wide spatial variation in the hazardousness of rural counties. Distinct hazards regions can be identified at the county level. County specific, and regional risk and response levels are particularly dependent on local conditions. However, state and national phenomena also are shown to be important. Risk patterns are explained by differences in the levels of industrialization, agricultural chemical use and hazardous materials transportation. Emergency response capability variation is based on past experience, urbanization, risk perception, environmental regulation, and rural economic and demographic change.

AN EQUITABLE APPROACH TO INTERNATIONAL REDUCTION OF GREENHOUSE GAS EMISSIONS by Barry D. Solomon, U.S. Environmental Protection Agency, Washington, DC 20460, and Dilip Ahuja, The Bruce Company, Washington, DC 20460.

This paper addresses the equity and political dimensions of the proposed climate protection convention. While it is generally recognized that major reductions in anthropogenic emissions of greenhouse gases will be required to markedly slow the rate of global warming, less than a dozen nations thus far have seriously considered emissions reduction strategies. Moreover, these leader nations are all industrialized democracies, representing only one eighth of the Earth's human population and about a third of greenhouse gas emissions. A strategy to increase international participation in a climate protection convention must highlight the role of fairness in order to bring more countries to the bargaining table. For example, relative national income and wealth, foreign debt, historic per caput emissions patterns, etc. will assuredly be considered in proposed reduction schemes.

In some cases it may be both equitable and economically efficient for a rich, energy-efficient country such as Sweden to finance energy conservation measures in a debt-ridden, energy-inefficient country such as Poland. Political coalitions are likely to form around vested economic interests, such as the industrialized democracies, centrally planned Europe, poor developing countries, and wealthier developing countries. Game theory will be used to indicate the implications of these coalitions and their participation or nonparticipation in a climate convention for devising protocols on emissions reductions and trading. To ensure maximum participation in negotiations, and a resulting just, lasting and effective treaty, the process must be viewed as equitable and flexible by as many nations as possible.

A DIFFERENT TIME, A LESSER SPACE: RESOURCE PRESSURES AND NATIVE AMERICAN SURVIVAL by J. Sonnenfeld, Department of Geography, Texas A&M University, College Station, Texas 77843

Programs in conservation and sustainable development commonly include cultural diversity and biodiversity as joint goals, in particular for populations in tropical and subtropical 3rd-world settings. These would seem equally important goals for those Native Americans who retain a separate cultural identity in the United States and Canada, and who also retain control over traditional resources, despite pressures from within and without their own communities for integration into the dominant economy and society. However, diminished and often fragmented tribal lands, and restrictions on access to traditional marine and river fisheries make it difficult to support culturally-consistent resource economies. Instead, many come to depend on the non-native community for employment or for income from the sale of tribal resources. As a result, their cultures, too, become fragmented, as traditional resource uses and resource values are set aside or become inoperative.

This paper examines (a) the changes in resource orientation of some Northwest Coast Indian (Makah, Siletz, Tlingit) and Alaskan Eskimo (Inupiat) communities; (b) the impact of these changes on the character of the cultures represented; and (c) the options that are available to young people in these communities, who are expected to choose between more traditional and non-traditional futures. The question is whether Native American communities and the cultures that they represent can remain viable without traditional resource orientations and values; or whether viability, instead, depends on adapting to new resource contingencies, which has obvious implication also for the character of the culture that survives.

LABOR SHED MODEL FOR ASSESSING ECONOMIC DEVELOPMENT IMPACTS, by Siim Soot, Department of Geography and Ashish Sen, School of Urban Planning and Policy, University of Illinois at Chicago.

A model to estimate the anticipated labor shed of new employment at a given site will be described. Using commuter rail, rail rapid transit, bus, and automobile travel times and a measure of occupational compatibility between residential origins and work destinations, a gravity model calibrated for the Chicago area is used to estimate residential source of labor by square mile neighborhoods. Sample applications to a 1033 square mile Chicago region will be illustrated. The labor shed effects of alternative developments at a given site will be shown, as well as, the effects of changing the employment site. The capability of the model to estimate the number and sources of minority employees will also be show. Lastly, a method is described to evaluate the impacts of job training on the labor shed. The presentation will conclude with a discussion of present efforts to interface the labor shed model with an input-output model to introduce the spatial element to the regional's input-output model. This effort and the previous three years of development and application work has been supported by the Joyce Foundation and the Woods Charitable Fund.

TEMPORAL RELATIONSHIPS AMONG MULTIPLE DROUGHT TYPES DURING AN AVERAGE DROUGHT by Peter T. Soulé, The University of Alabama, Tuscaloosa, Alabama 35487.

The primary purpose of this paper is to examine the concurrent temporal patterns of drought subtype severity during the first six months of an average drought event. The methodology employed in this study is designed to help search for the underlying signals or patterns across a sample of unique drought events. Monthly values of the Palmer Moisture Anomaly Index (ZINX), Palmer Drought Severity Index (PDSI), Palmer Hydrologic Drought Index (PHDI), and standardized scores (z-scores) of precipitation (PREZ) and temperature (TEMPZ) were collected from each major drought event occuring during the period 1931-1985 at eight geographically dispersed climatic divisions within the contiguous United States. Average values of each index were calculated using data from month one, two, etc. to produce a time series of drought severity for each climatic division. Multiple-line graphs are used to present the time series.

Overlaying the graphs from any two climatic divisions reveals that there are no perfect matches in the temporal progression of drought severity within the sample. However, strong similarities in the patterns are evident among several climatic divisions, and the trends for certain pairs of drought indices (e.g. PHDI, PDSI) are largely consistent across all climatic divisions. Although there is some spatial variability in the strength of this relationship, the graphs show that during the initial months of an average drought event temperatures will be above normal and precipitation below normal. The longer these conditions persist, the greater the magnitude of meteorological and hydrological droughts.

MEXICO'S MAQUILADORAS-DEPENDENCY DEVELOPMENT by Robert B. South, Department of Geography, University of Cincinnati, Cincinnati, Ohio 45221.

Mexico's Border Industrialization Program, formulated in the mid-1960's to attract foreign manufactures, has had a significant impact on industrial growth, and the nation's economy. More than 1500 manufactures for export (maquiladoras) with an employment exceeding 400,000, presently generate the second largest source of foreign exchange for the Mexican economy. Most maquilas, 87 percent of the plants, are located in economic enclaves along the Mexican/U.S. border. The agglomeration of maquilas presents a classic example of export-led industrialization fueled by foreign investment and raises questions of development for whom. This paper examines the issue of maquiladoras, regional economic growth, and dependency development. The research analyzes criteria for the transition of economic enclaves to development zones in two locations; a border city, and an off-border location, Monterrey. The extent of backward and forward linkages from maquiladoras to the host economy, and the role of indigenous management are used as measures of dependency development. In addition, case studies on foreign exchange retention generated by maquiladoras are reviewed. The findings demonstrate that dependency reversal, the transition of economic enclaves to development zones, is in large measure a function of location. Irrespective of location, however, if maquiladoras are to contribute to economic development in any substantive way, then the Border Industrialization Program must now focus on the development of backward linkages (sourcing) and forward linkages to indigenous manufactures and markets.

SNOW COVER IN WESTERN CHINA by David A. Robinson and Theresa Spies, Department of Geography, Rutgers University, New Brunswick, NJ 08903, Peiji Li and Meisheng Cao, Lanzhou Institute of Glaciology and Geocryology, Lanzhou, China and George Kukla, Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY 10964.

Snow cover and snow/climate relationships in western China are being studied in a cooperative Sino-American effort. The initial task of the project is to document snow cover and surface albedo in this region. This involves integrating information from decades-long (1955-1980) records of daily snow cover for 170 stations, visible and passive microwave satellite-derived snow analyses and field measurements of snow properties.

Snow cover is far from a pervasive feature over large portions of the region at any time of the year. Only the mountainous areas and the region north of the Tien Shan mountains have a persistent winter cover. Snow is rare in the Tarim Basin. Snow cover is an ephemeral feature over most of the Tibetan Plateau and may repeatedly persist for several days to a week over portions of the area from October to April. Despite the absence of masking vegetation, the lack of an extensive (and deep) snow cover over much of western China results in significantly lower winter surface albedo over this cold region than might be expected.

Empirical and modeling studies suggest that snow conditions in central Asia and in particular over the Tibetan Plateau play a significant role in seasonal atmospheric conditions on local to hemispheric scales. However, studies to date have relied on extremely limited or at worst incorrect information regarding the nature of snow in this region.

PATTERNS OF COLLEGE RECRUITMENT IN OHIO, 1982 AND 1988 by J.Spinelli and B. Smith, Department of Geography, Bowling Green State University, Bowling Green, Ohio 43403

The purpose of this study is to determine the effect of distance on the pattern of recruitment of college students to each of the twelve state-assisted universities in Ohio from each of the state's 88 counties. The student data compared were for 1982 and 1988. Each university's proportion of students attracted from the total in Ohio going to Ohio state-assisted schools, determined on a county-by-county basis, was used as the measuring point. A market penetration index (MPI) was determined for each university to show which counties sent more or less than the university's proportional share. Geographic patterns reveal which parts of the state provided the most and the least students to each school. A distance-decay factor was shown to exist.

CRIME AS THE LATENT PRODUCT OF IMPLEMENTED PLANNING POLICIES by J. V. Spring, Illinois Criminal Justice Information Authority, 120 South Riverside Plaza, Chicago, IL 60606

Using point data and the Spatial and Temporal Analysis of Crime software developed by the Illinois Criminal Justice Information Authority, select crimes in a suburban community are examined. The purpose of this research is to illustrate, in a case study approach, how certain implemented planning policies unintentionally create, increase, or exacerbate a crime problem. For example, what effect does major road resurfacing or minor road work have on crime patterns? Does the increased access or ease of travel after project completion translate into more crime incidents occurring in the area? In another instance, how long does it take a new subdivision to attract auto thieves and burglars, and how long before it becomes an established community and loses its attraction to criminals?

THE RESHAPING OF THE SMALL TOWN, Michael Spyrou, Department of Earth Sciences, The University of North Carolina at Wilmington, Wilmington, NC 28403-3297.

The automobile and the shopping center are reshaping the form and character of the small town. The research, drawing examples from a number of small towns from North Carolina, has identified that there exists two Main Streets in each community, the traditional and the modern.

The presence of two commercial corridors exert different influences on the growth patterns of small towns. On the one hand, the traditional Main Street has remained as an administrative public service center, is generally underutilized, and attempts are made for its preservation and revitalization. On the other hand, the modern Main Street has become an agent of urban sprawl and dispersal of residential developments and economic activities.

The paper examines the implications these patterns of development have on the form and function of the small town and emphasizes the need for more innovative methods in rural land use planning.

THE ANNUAL PRECIPITATION "DROP-OFF" IN CENTRAL OKLAHOMA by Stephen J. Stadler, Geography Department, Oklahoma State University, Stillwater, OK 74078, and Edwin Kessler, Geography Department, University of Oklahoma, Norman, OK 73019

The literature has described an annual double maximum of precipitation in much of the central United States. In central Oklahoma, the descent from a late-spring rain-plentiful time to an early-summer dry time seems to be more abrupt than in other places. We have labeled this phenomenon the precipitation "drop-off." We have examined the long-term records of a number of Oklahoma's cooperative and first-order stations. The drop-off can be seen in central Oklahoma data and not in surrounding stations. We have viewed the data from aggregated and disaggregated perspectives. Whereas a decline is present in climatological aggregations of the data, a drop-off is obvious by disaggregating data into individual years. The typical precipitation maximum is in late May and the minimum is in the beginning of July, but the precipitation peaks and valleys fluctuate significantly around these dates.

We speculate that the cause of the drop-off is in the timing of passage of the jet stream across Oklahoma. As the jet axis shifts to the north, subsidence to its south abruptly curtails convectional precipitation possibilities. The reason the drop-off effect seems to center on Oklahoma is because of its continental position relative to the Gulf of Mexico.

SOCIAL CLEAVAGES AND GEOGRAPHIC PATTERNS OF URBAN ELECTORAL BEHAVIOR by Lynn Staeheli, Univ. of Colorado, Boulder, CO 80309-0260, and David Hodge, Univ. of Washington, Seattle, WA 98195.

The political culture of American cities is a complex mixture of traditional class-based issues as well as emerging, if not dominant, consumption-based issues. In many ways, it is the presence of these two powerful and often contradictory dimensions that defines what Katznelson has labelled American exceptionalism and what we argue is the basis for American urban political culture. In this paper we explore patterns of support for nearly ten years of issue elections in King County, Washington. Previous work has confirmed that most of these issues cluster into either a production-based or consumption-based dimension. Patterns of support for each of these dimensions are analyzed using three sets of independent variables which reflect what we argue are the principal social cleavages of modern American urban society: production status, consumption status, and geographic status. Significantly, we find that geographic status plays a special role in defining voter behavior.

SPATIAL PATTERNS OF MANUFACTURING PLANT BIRTHS AND DEATHS IN OHIO by Q. Wu and H. A. Stafford, University of Cincinnati, Cincinnati, Ohio 45221-0131.

Number and rates of manufacturing plant openings and closings have been calculated for the counties of Ohio. The correlations of number of openings and closings with the total number of manufacturing plants per area are very high and positive. More interesting are the patterns of plant birth and death rates over the 1978-87 period. Suburban areas show higher birth rates than do central city or rural areas. For the 88 counties, 40% of the spatial variation in opening rates is explained by five variables. For the sub-sample of metropolitan counties 62% of the spatial variation in opening rates is explained by four similar variables. In general, higher rates of openings are found in areas which are diversified and are performing well in most other economic dimensions.

Closing rates exhibit less distinct and explainable spatial patterns. Variations among central MSA, suburban and rural counties are not significant. Only 22% of the variation over the 88 counties is explained by the 3 significant variables. Regional characteristics, such as labor costs, taxes, degree of urbanization and plant birth rates are not significantly correlated with death rates. For both openings and closings, examinations of individual plants and firms are recommended for more complete understandings. This is especially true for plant deaths since they appear much more idiosyncratic than births. A traditional geographic correlates of manufacturing change approach is of some value in understanding openings, but is virtually useless in explaining spatial variation in closure rates.

RESOURCE RECOVERY, SOLID WASTE MANAGEMENT AND RECYCLING IN BROOME COUNTY, NEW YORK by C.E. Stallman, Cornell Cooperative Extension of Broome County, Binghamton, New York.

Dealing with solid waste disposal planning in Broome County, NY is complicated by the existence of two agencies that have different charges related to management but must cooperate in order for the county plan to be effective. Three years ago a comprehensive, integrated Solid Waste Management Plan was created. It contained several elements, including resource recovery through trash burning, a tipping fee structure for a landfill operation and a household recycling program. Since that time, the responsibility for resource recovery (the trash burning plant operation) has been transferred to a new, independent agency, while the remaining functions have remained the responsibility of the county government.

This paper analyses the infrastructure, politics, successes, limitations and other aspects of the Broome County plan and operation.

RADIATION BALANCE OVER A SEASONAL SNOWCOVER: MORMON MOUNTAIN, ARIZONA by Diane M. Stanitski, Arizona State University, Tempe, Arizona, 85287.

Radiation measurements were collected as part of an energy balance-snowmelt study of seasonal snowcover in the southern subhumid Colorado Plateau. Observations were taken at the Soil Conservation Service Snow Telemetry site, Mormon Mountain, Arizona, immediately adjacent to the mountain and within Merriam's transitional forest zone.

The study focuses upon six diurnal periods, extending from early January (12 January 1989) until the last snow in late March (29 March 1989), from which direct measurements of incoming and outgoing short-wave radiation and net radiation were recorded at fifteen minute intervals. Preliminary analyses identify an early morning input of long-wave radiation (due to forest shading) which initiates warming prior to the arrival of short-wave radiation. This paper defines the individual radiation components and their impact upon the seasonal snowcover throughout the study period.

BIOGEOGRAPHY OF TONGAN LANDBIRDS BEFORE AND AFTER HUMAN IMPACT by David W. Steadman, New York State Museum, 3140 C.E.C., Albany, NY 12230.

Tonga is a Western Polynesian archipelago with 30 islands $>0.5\text{km}^2$. The current resident avifauna consists of 22 indigenous species of landbirds, eight of which are confined to three or fewer islands. All but one of the 22 Tongan species occurs as well in Fiji and/or Samoa. Recent excavations on the islands of Lifuka and 'Eua show that their avifaunas are much less speciose today than before the arrival of humans about 3000 years ago. 'Eua, for example, has 14 species of landbirds today (more than any other Tongan island), but had at least 25 species in pre-human times. The extinctions/extirpations, which post-date the arrival of Polynesians, include 2 rails, 3 pigeons, 2 parrots, and 4 passerines on 'Eua, and 2 megapodes and 3 pigeons on Lifuka. The limited extent of the excavations on both islands suggests that many additional species remain to be found. Most of the extinct or extirpated species from Tonga, or their closest relatives, are or were found in Fiji/Samoa. Thus the prehistoric increase in species richness yields little geographic increase in the biogeographic affinities of the Tongan avifauna.

RESTRUCTURING SOVIET AGRICULTURE: TOWARDS A SPATIAL DIMENSION by I. Stebelsky, University of Windsor, Windsor, Ontario N9B 3P4.

The purpose of this paper is to describe and explain the restructuring of Soviet agriculture launched by Gorbachev. The paper will focus on the new types of organizational structures emerging and on the processes involved.

A survey of Soviet press, notably the daily farm newspaper, Selskaya zhizn, will be carried out to document and detail the new organizational forms of farming that are emerging in different parts of the Soviet Union. Historical perspective of previous organizational forms in Soviet agriculture and their relationships to the natural environment and the peasant cultures as they differed from region to region will be employed for the purpose of assessment.

In the light of the rich variety of antecedent structures and their spatially differentiated distribution that existed during the New Economic Policy before collectivization, it is reasonable to expect that, as restructuring continues, similar patterns of spatial differentiation, reflecting better harmony with the natural environment and cultural preferences, will emerge.

THE METHODOLOGICAL CHALLENGE: FROM SOCIAL THEORY TO GEOGRAPHIC ANALYSIS by Ben Stein, University of California - Los Angeles, Los Angeles, CA 90024.

A satisfactory analysis of space and social transformation in Latin America and Africa requires a methodology that incorporates the insights provided by recent critical works in social theory. The critique of historical materialism by Giddens has left a methodological wreckage of class analysis but not developed an alternative to fill the void. The insistence of geographers such as Soja for the reassertion of space in critical social theory leaves unanswered the question of how this should be done. And works from Gramsci to J. Scott emphasize the importance of consciousness in shaping individual and collective action.

The way suggested here to incorporate the theoretical developments is to identify conflicting interests, groups struggling to promote or defend their interests (agents), their use of space and social constructs (structures), and their shaping by these structures (media). The purpose is to provide a coherent framework within which the focus of analysis can be directed to how these factors (interests, agents, structures, and medium) influence social outcomes. Social structures, space and consciousness are both the tools manipulated by agents to promote and defend their interests and the limiting medium within which they exist. Struggle remains central to the analysis but is dealt with as the collision of many scattered and often diffuse forces rather than the opposition of a few distinct ones.

STUDENT IMAGES OF TORONTO AND BUFFALO SOURCES AND REALITIES

Gregory P. Stein, Buffalo State University
Marguerite J. Keall, York University

The two authors teach urban studies and/or geography respectively at York University on the edge of Metropolitan Toronto, and at Buffalo State College in Buffalo, New York. They have organized and hosted field trips for each others' students for the past ten years.

The relatively short distance between these two urban areas allows the students, overwhelmingly local, to have certain images of the other city area. The trips allow the testing of these images and generalizations about cities.=, as expressed by Goldberg and Mercer.

Buffalo and Toronto are within 80 miles (130 kms) of each other. The trip can take fifteen minutes, airport to airport, but the usual trip is by auto, two to two and a half hours. A historical analysis shows the cities to be at vastly differing economic stages and sizes throughout most of their histories and even to the present. Local students have very dim ideas about the political and social institutions in the other city/country. It is necessary to discuss suburban growth in the context of Ontario's metropolitan government system as well as the relative fragmentation of the Buffalo P.M.S.A.

Students' preliminary images are based on media presentations, anecdotal reports, or casual leisure oriented visits. The formal exchange results in change in both attitude and perception. Hence we have a clientele of various students of urban studies for whom we provide an experience in another city (and country) as well as in their home city. This aids their understanding of urban form and process in a comparative context.

COGNITIVE PROCESSING OF GRAPHIC AND VERBAL INFORMATION ON MAPS by Theodore R. Steinke, Department of Geography, University of South Carolina, Columbia, S.C. 29208.

An experiment was conducted to determine the nature of the cognitive processes that are used in the recall of qualitative information from maps. Maps were designed with information presented in either a graphic or a verbal form as well as in either a geometric or pictographic style. The number of symbols or symbol names present on the maps varied from three to seven. Subjects were shown a map for a short time and, after it was removed, were asked whether a particular symbol or symbol name had been present on the map. The accuracy and latency of their responses were recorded and used to test hypotheses about the cognitive processes used in the memory and recall of the map information.

Psychologists have found that, when trying to solve similar memory problems, people may process the information in serial or sequential order if, for example, the information has been coded in the form of a list or they may process the information in parallel or holistically if it has been coded as an image. In certain situations verbal coding and serial processing may be more efficient, whereas in other situations imagery coding and parallel processing may be more efficient.

The results of this experiment suggest that serial processing was used regardless of whether information was presented as graphic symbols or symbol names and that subjects were more accurate in recalling symbol names than the graphic symbols and that they were able to recall pictographic symbols more accurately than geometric.

THE RATIONALIZATION OF ADMINISTRATIVE SUBSTATE REGIONS by Herschel Stern, MiraCosta College, One Barnard Drive, Oceanside, CA, 92056

In this paper I discuss a general process for the development of administrative substate regions and its application to Oregon state government. The process and its application are based on: 1) the history of substate regionalism in Oregon, particularly regarding a failed attempt to institute a standardized system of regions, 2) existing theories about substate regionalism, and 3) characteristics of substate regions currently used by Oregon state agencies. The general process consists of eight phases including analysis of the current system, identification of problems, setting of goals, and development of a regional policy. By applying the general process I have developed a series of related regional configurations to serve as the basis of a rationalized, standardized system of adminstrative substate regions for use by Oregon state agencies. The system is designed to respond to the specific geographical needs of state agencies, certain political constraints, and the socio-economic functional geography of Oregon.

CATALAN ENTREPRENEURS IN NINETEENTH CENTURY MATO GROSSO, BRAZIL by Hilgard O'R. Sternberg, U. of California, Berkeley, CA 94720.

Based on field work and archival research, the paper examines one episode as a succession of actors with differing aspirations controlled the same territory in the Pantanal, a vast alluvial plain in the upper Paraguay Basin, near the divide with the Amazon.

When Castile's monopoly of trade with the Indies terminated in the late 18th Century, a number of Catalans established themselves in the Plata. Some pioneered the development of the *saladero*, an establishment for the production of salted meat, or *tasajo*, much in demand by slave owners in Brazil and Cuba. Meanwhile, vessels built in Catalonia sailed the triangular *ruta del tasajo* between Spain, the Rio de La Plata and the Antilles.

Such was the background of Jaime Cibils B., scion of a Catalan-Montevideo family, which represented an economic empire that included shipping, saladeros, banking, insurance, and other enterprises. In 1881, Cibils arrived in the Pantanal, with its hundreds of thousands of feral cattle, in order to acquire a holding, later known as Descalvados (an estimated 300 sq. leagues with some 150,000 head). Cibils was aware of problems: seasonal difficulty of navigation, alternating with flooding; loss of cattle to rustling and jaguars; an equine trypanosomiasis resulting in a shortage of horses. Such matters did not discourage him, and his unpublished log is full of plans for improvements (e.g. introduction of fodder plants and construction of dikes to curb flooding). Indeed, a modern meat extract industry was inaugurated as early as 1882.

However, in 1895, Cibils signed over Descalvados to a firm in Antwerp that fronted for Leopold II. The King of the Belgians, had long entertained expansionist aspirations with respect to Brazil, and used the property to mount a thrust into rubber-producing Amazonia. In 1911, the Belgians, in turn, divested themselves of the Mato Grosso holding, conveying it to a U.S.-based international syndicate.

RIVERS WITHOUT BOUNDARIES: THE LA PLATA BASIN AS A DOMINANT ENERGY SOURCE by Rolf Sternberg, Montclair State College, Department of Environmental, Urban & Geographic Studies, Upper Montclair, N.J. 07043.

Hydroelectric projects in the La Plata basin contribute to enhanced diplomatic relations among basin states and increased energy autonomy. Existing, in construction, and planned dams, differ from national projects of this kind because of their bi-national character which confers a special identity upon them. Construction of these dams has to meet diplomatic fine points and bilateral financing aside the conventional approaches such projects have to satisfy. If one state assumes the total investment burden, this state sets the construction pace as exemplified by Itaipu Bi-Nacional. In the La Plata basin the quest for energy independence of individual states has hastened the internationalization of hydroelectric power, with Paraguay becoming the leading international electricity supplier in the region.

This analysis includes a functional model of bi-national projects in the La Plata basin that serve to foster regional energy security. The model includes the political context in which national security benefits from bi-national agreements for hydroelectric power. Internationalization of the transmission system is limited by diversity in the K-hertz cycles within individual state systems.

Rivers Without Boundaries is an exploration of subject matter that is consensual in scope and practical in application. History, politics, economics, self-interest and planning are diplomatically molded to meet growing domestic energy needs. Hydroelectricity produced in the La Plata basin will contribute to serving the energy needs of the largest population concentration in South America.

MORPHOGENETIC FACTORS OF NATURAL ARCH DEVELOPMENT IN ARCHES NATIONAL PARK, UTAH by Dale J. Stevens, Department of Geography, Brigham Young University, 690 SWKT, Provo, Utah 84602 and Carl A. Horton, Department of Geography, University of Utah, Salt Lake City, Utah 84112

Over 1000 natural arches and bridges in ARches National Park were examined to establish their occurrence, density and morphology. Because those found in exposed sandstones along the northeast side of the Salt Valley Anticline demonstrate a wide range of morphologic characteristics within a uniform lithology, they were selected for a correlative study. The morphogenetic factors which appear to be most responsible for differences in sizes, shapes, types and surface texture of the approximately 300 arches used in the analysis, are conditions of the environment, and to a lesser extent, minor lithic variations. The environmental variables used in this study are: vertical and horizontal thickness of arch spans, surficial petrographic composition, geographic site, exposure azimuth and dip. Although a complete explanation to natural arch development is not fully understood strong correlations were found between most variables.

ONE STOP SHOPPING IS NOW AVAILABLE TO THE GLOBAL EXPRESS/CARGO SHIPPER by Thomas J. Stevens, Federal Express Corporation, Box 727, Memphis, TN 38194 USA

Prior to 1973, there was no method short of chartering an aircraft to get a package from Albany to Albuquerque overnight. There was no infrastructure in place to facilitate that kind of movement. Federal Express changed that condition with its "hub and spokes" express parcel pickup and delivery system.

Prior to 1989, there was no single source for pick up and delivery of express parcels (under 70 kilograms) and air freight (over 70 kilograms) available to the hundreds of thousands of just-in-time manufacturers and their customers located throughout the developed economies of Asia, the Americas, and Western Europe.

With the purchase of Flying Tigers Line by Federal Express, a worldwide infrastructure was created to provide single source pickup and delivery of time sensitive documents and goods and air freight.

This study compared and analyzed the air express/air cargo routes, transit times and capacity of the two carriers between the cities served in Europe, Asia and the Americas prior to and after the merger.

By design, the Federal Express air express/cargo system will help revolutionize the way the global economy does and will do business in the 1990's and beyond.

SNOW AVALANCHE HAZARD ALONG MOUNTAIN ROADS: A COMPARATIVE STUDY by H. Daniel Stillwell, Geography and Planning Department, Appalachian State University, Boone, North Carolina 28608.

Mountain environments throughout much of the world are experiencing increased use. Major causes include improved access and greater population pressure as well as increased interest in winter recreation. Mountain roads are becoming more vulnerable to snow avalanches with the associated risk to life and property.

This study compares two roads, the Milford Road in South Island, New Zealand and the Stubai Valley Road in Tyrol, Austria. Its purpose is to determine common characteristics of avalanche tracts which might allow an evaluation and prediction of hazard danger. This in turn would give a basis for procedures and actions to mitigate risk.

Research methods involved the mapping and analysis of morphological variables. These included the number, size, shape and frequency of avalanches, their slope length, angle and aspect, as well as the altitude of starting and run-out zones. An internationally-used hazard index compared the danger to traffic along each road.

Results show some difficulty in comparing avalanche hazard in divergent settings. Recommendations include relocation of road sections, building deflection structures and creating a zoning plan to control development.

PATTERNS OF RELIGION IN SRI LANKA by Robert H. Stoddard, University of Nebraska, Lincoln, NE 68588-0135

The distribution of religions in Sri Lanka conveys understanding about the patterns of several other human phenomena. When the distributions of Buddhists, Hindus, Muslims, and Christians are mapped, it is observed that they display a high degree of regionalization. Because the spatial characteristics of regions depend on the level of areal generality, here two different sets of areal units are displayed and examined. Although the religious patterns of the two sets are not identical, their generalized distributions do express geographic differences that are basic to life in this country.

Religious patterns are closely related to (1) landscape features, (2) ethnic distributions, and (3) political viewpoints. Contrasts in landscapes are quite evident in the architectural styles of religious structures, but other features also reveal the patterns of religion. Likewise, the distributions of religious populations are associated with variations in ethnicity, which, in turn, have been manifested politically. Although it would be misleading to interpret recent political conflicts as arising from religious differences, the patterns of religion are significant in understanding current events in the country.

ANALYSIS OF SURFACE TEMPERATURE VARIATION DUE TO LANDUSE IN PHOENIX, ARIZONA by Matthew J. Stoll, Arizona State University, Tempe, Arizona 85287-1508.

Meteorological conditions and varying landuses in the Phoenix, Arizona metropolitan area provide an ideal location for an urban heat island investigation. During summer 1989, three meteorological stations were operated on a 24-hour schedule at different locations -- one in the western suburbs, one in the city center, and one in the eastern suburbs. Air temperature, surface temperature, soil temperature, relative humidity, and solar radiation were measured at each site. Further data on surface temperature variation due to landuse were acquired utilizing infrared thermometers (IRT) (8-14 micron bandpass, 15 degree field of view) mounted on a helicopter. Transects were flown over predetermined landuses at two different altitudes (500 ft. above ground level and 5000 ft. above sea level). Results indicate surface temperatures varying according to urbanization. Corrections for field measured emissivity values help determine the extent of surface temperature variation. Predictive relations between air temperature and surface temperature in the urban area were also developed.

EFFECT OF PARTICLE SIZE AND SEDIMENT GEOCHEMISTRY ON PHOSPHATE ADSORPTION by M. Stone, Wilfrid Laurier University, Department of Geography, Waterloo, Ontario, N2L 3C5.

Increased awareness of the role of fluvial sediment as a transport mechanism of nutrients and contaminants to receiving water bodies has prompted the need to further examine sediment-contaminant/nutrient dynamics. Although many factors affecting phosphorus (P) adsorption on sediment have been studied extensively, the role and participation of specific particle size fractions of lake and river sediments on the adsorption of P is not well documented. The purpose of this study was to examine the effect of particle size together with chemical composition and mineralogy on the adsorption of inorganic P by various particle size fractions of river sediment.

Sediment samples collected from two Lake Erie tributaries, were seperated into ten particle size fractions. The concentrations of major elements, organic and inorganic carbon, mineralogical composition and the capacity for adsorption/desorption of inorganic P were determined for each particle size fraction. Adsorption behavior of various particle size fractions of river sediment were compared with similar size fractions of a control sediment, pure silica sand.

Results of the analyses with silica sand suggested that particle size only had no effect on the adsorption of P. However, despite the complex mineral assemblages abundant in river sediment, chemical composition and mineralogy were parameters controlling adsorption of P on sediment particles. Increased adsorption capacity in the <13um size fraction was attributed to clays (kaolinite, illite and pyrophylite), Fe and Mn oxides/hydroxides and organic matter. This study demonstrates that the geochemical composition of the <13 um sediment size fraction of sediment is an important factor in the potential transport and release of sediment-associated phosphorus from tributaries into Lake Erie.

THE EVOLUTIONARY SYNTHESIS: A UNIFIED THEORY FOR HUMAN SPATIAL SYSTEMS by Debra Straussfogel, The Pennsylvania State University, University Park, PA 16802

The body of theory in our discipline is less a body, than a collection of unarticulated skeletal parts, some of which hang together quite coherently, while others are ill-fitting grafts. In effect, Geographical Theory is a straw construct. The theoretical and methodological needs of the various sub-fields are developed internally to each. Our body lacks a backbone onto which the fleshed-out limbs may be comfortably attached. An extensive body of research summarized as "The Evolutionary Synthesis", however, may provide the structural integrity needed by Geographic Theory.

Undergirding The Evolutionary Synthesis is a clear statement of the essential components of any system, and the role of each component in contributing to and effecting change in the system over time. The achievement of the Evolutionary Synthesis is in providing a universal framework to describe and explain how systems of all types have come out of their own pasts to achieve their current states, and how they might be configured in their futures. The novelty of the Evolutionary Synthesis is that it is not a prototype for system behavior forcing analogy and conformation. It attempts to define the absolutely basic elements of systems and system evolution which are at the core of what superficially appear to be wholly disparate entities.

Several of the lines of research included within "The Evolutionary Synthesis" have already found their way into geographic inquiry (eg. bifurcation theory, catastrophe theory and fractal geometries.) This paper summarizes the essential concepts which form the "synthesis," and the many avenues leading to it. It then describes how the concepts defined apply to the study of geographic systems, and how they offer a solution to the problem of the fragmentation of the body of geographic theory.

ICONOGRAPHIES OF POWER. Some Reflections on the Readability of Urban Landscapes. By Ulf Strohmayer, Department of Geography, The Pennsylvania State University, 302 Walker Building, University Park, PA 16802.

In trying to translate some of the insights gained by so-called postmodern philosophies into a spatio-geographic kind of terminology, this paper tries to challenge a rather fundamental paradigm of social geography: The presumed ability to read and hence write about space(s). Thinking about primarily urban landscapes as consisting of metonymically interrelated chains of signs exposes their analysis, the writing about, to in fact undermining critique. Beyond legitimation - will there have been a GeoGraphy?

And yet - if we nonetheless claim the urban scene as the primary locale of social transformation within Western societies, how do we go about this crucial question of rePresenting 'space', the 'text' of a city? Textures abound - unified solely by means of signifying imprints of power? But then, isn't there a genuine 'democratic' space, a space that enables rather than constrains?
Time to speculate.

PROBLEMS ASSOCIATED WITH THE OVERPLATTING OF LOTS IN LEE COUNTY, FLORIDA by Hubert B. Stroud, Arkansas State University, State University, Arkansas 72467

This paper assesses problems created by the overplatting of land in Lee County, Florida. Lee County, located along Florida's southern Gulf Coast, has been subdivided into more than 350,000 lots, 242,000 of which remain vacant. Many of these lots were platted within large subdivisions years ago and no longer meet current standards and regulations. Extensive field work and the use of case studies show that the premature commitment of land to single family homesites years or even decades prior to a legitimate need for building sites creates vast tracts of vacant land, drastically reduces land use flexibility, and prevents developers from responding to market demands for different types of dwelling units as the area grows. Developers of new projects often seek unplatted tracts of land that are more suitable for contemporary development than the previously platted property within older subdivisions. This practice leaves large segments of the older lot sales subdivisions vacant and exerts even greater pressure on the county's dwindling land resources. These and other difficulties suggest that options are needed for resolving these vexing problems. Possible remedies include lot merger, transfer of development rights, plat vacation, infrastructure requirements, and condemnation. Unfortunately, few if any of these options are likely to be implemented in Lee County. While county officials expressed concern about rapid growth, they have no intention of limiting or restricting growth and oppose growth management techniques that may discourage development.

THE USE OF THE DELPHI TECHNIQUE IN GEOGRAPHY by Russell L. Stubbles, Department of Horticulture, Forestry, Landscape, and Parks, South Dakota State University, Brookings, SD 57007.

In the 1960s researchers began using the Delphi technique, a qualitative forecasting method. This exploratory paper reviews the basics of the Delphi and then examines its use by geographers and non-geographers. It appears that non-geographers use the Delphi technique more readily than do geographers. Possible reasons for this difference in usage are given.

PATTERNS OF RELIGIOUS AFFILIATION IN THE MONTREAL METROPOLITAN AREA by Roger W. Stump, State University of New York at Albany, Albany, New York 12222.

As a leading urban focus of Canada's multicultural society, Montreal has developed a diverse cultural complexion. This paper examines the geographical expression of that complexion as revealed in patterns of religious affiliation, a key component of the city's diversity.

The discussion centers on three analyses: a comparison of the distributions of individual religious groups within Montreal; a regionalization of overall patterns of religious affiliation throughout the city; and an assessment of the relationship between religious patterns and spatial variations in other cultural, social and economic characteristics. These analyses are based on census tract data for the Montreal metropolitan area from the 1981 Census of Canada, and on field work conducted in Montreal.

The analyses reveal significant differences in the degree to which individual religious groups are spatially concentrated within the city. After accounting for group size, the highest levels of spatial concentration occur among groups with a strong ethnic association. The religious diversity of the population also varies markedly throughout the region, the most diverse areas being located in the central and western parts of Montreal Island. The interaction between patterns of religious diversity and the spatial concentration of individual groups has in turn produced distinctive regional variations in religious affiliation across the metropolitan area. These variations are in part associated with the distribution of ethnic identity, but also reflect other social and economic contrasts within the area.

URBANIZATION IN SILICON VALLEY, 1980-1987
by Timothy J. Sturgeon and Richard A. Walker
Department of Geography
University of California at Berkeley
Berkeley, CA 94720

Abstract:
The boom in the Silicon Valley semiconductor industry during the period 1980 to 1984, followed by a severe downturn through 1987, was mirrored by furious construction activity in industrial real estate, resulting in a grossly overbuilt market. The paper takes a unified approach to the twin processes of urbanization: the development of production *in* space (i.e. industrialization) and its necessary concomitant, production *of* space (i.e. property development and the construction of the built-environment). Ramifications for disequilibrium growth in new industrial spaces and construction cycle theory are addressed.

SOCIAL NETWORKS AND SPATIAL BEHAVIOR OF DOWNTOWN POOR VIS-A-VIS ENVIRONMENTAL CHANGE by Frederick P. Stutz, San Diego State University, San Diego, California 92182.

Due to research and testimony, the Golden West SRO Hotel in downtown San Diego was saved from demolition and now sits adjacent to the 10 acre, intensely developed, Horton Plaza shopping arcade. But, how have the residents in this hotel adjusted to major environmental change which has occurred about them? Sixty-five intensive interviews with long term residents revealed that, while the prices of rooms, food and clothing had been forced upward in the neighborhood and their trips were now somewhat longer than before redevelopment, the overwhelming majority of residents, as opposed to the responses collected by this author in 1976, liked the changes. While the residents made few purchases within the Horton Plaza complex, they felt the new shopping center had cleaned up the downtown neighborhood, formerly a skid row, and now provides a fascinating and fast paced diversion to everyday life. Most visited the center at least once a week and enjoyed the changes in the neighborhood. Walking is an important part of the residents' daily lifestyle. Movement fields have been stretched away from the redevelopment to the east, south and towards the new skid row area. Factor analysis of social ties based on perceived utility from interaction versus the costs of interaction, elucidated three groups of stress mediators within the SRO residents' social networks. These groups included neighbors within the hotel itself, friends within the CBD and family and relatives who live elsewhere.

RUNOFF-PRECIPITATION RELATIONSHIPS FOR AN URBANIZING WATERSHED IN ATLANTA, GEORGIA by Philip W. Suckling, Department of Geography and Bruce K. Ferguson, School of Environmental Design, University of Georgia, Athens, Georgia 30602.

Runoff-precipitation relationships are investigated for the Peachtree Creek watershed in northeast metropolitan Atlanta for the years 1958-1988, which corresponds to a period of rapid urban growth in the area. The impact of urbanization upon the hydrologic relationship between runoff and precipitation is analyzed in a regression model using annual data. Results indicate that the latter (more urbanised) half of the study period had less runoff during dry years and more runoff during wet years for given precipitation totals, compared to the first (less urbanised) half of the study period. To substantiate these results, the 7-day average low-flow and peak-flow periods are identified for each year and found to be best correlated with the previous 210-day precipitation total and the precipitation during the 7-day peak event, respectively. In a regression model involving 7-day low flows versus previous 210-day precipitation, the lowest precipitation totals during the more urbanized years again produce less runoff compared to similar precipitation totals during the less urbanised period. In a regression model of 7-day peak flows versus precipitation during the event, the highest precipitation totals during the more urbanized period again produce greater runoff compared to similar precipitation totals during less urbanised years. Although the results are not very significant statistically, this study provides some insight into the potential impact of urbanization upon the runoff-precipitation relationship.

A CENSUS AND SURVEY OF CANADIAN GREAT LAKES-ST. LAWRENCE RIVER RIPARIANS by Anne Sudar and Gary Jones, Environment Canada, 867 Lakeshore Road, Burlington, Ontario L7R 4A6.

The results of a census of Canadian Great Lakes and St. Lawrence River shoreline properties will be presented, including information on land use, ownership, and size of properties. In addition, a survey of shoreline property owners will be discussed. The focus of the survey is perceptions of riparian property owners on several facets of the fluctuating water level issue: water level regulation; causes of fluctuations; who is responsible; water levels communications; setback zoning; insurance, etc. A social and economic profile of riparians will also be presented, as well as data on the physical and economic impacts of fluctuations on shoreline properties. This paper will contain a basin-wide assessment of the damages that have occurred, the actions that people have taken, and the threat that they perceive. Because of the rigour of the sample size, we will be able to break out specific shoreline segments or areas and do comparative analyses of impacts between areas and situations.

LOCATIONAL IMPLICATIONS OF "IT"-BASED PRODUCTION PROCESSES: A CASE OF JAPANESE PRECISION MACHINERY INDUSTRY, by Noriyuki Sugiura, Keio University, Faculty of Economics, Tokyo,Japan.

What is broadly termed "Information Technology"(IT) has been changing not only the contents of manufactured goods and types of services, but also the contexts, i.e. spatial organization, in which these productions are actually taken place.

This article will examine the on-going technological innovations related to the production-processes, as well as their implications to spatial/locational organization of manufacturing in a "high-tech" society.

The recent trend of industrial re-organization or restructuring in Japan will be illuminated as a case study, with a special emphasis upon its precision machinery industry based on IC/LSI. Both vertical integration of production and horizontal/spatial one will be intertwined in the discussion.

In so doing, the conventional ideas on spatial dévision of labor will be critically scrutinized.

RURAL ONTARIO ROADS, 1850-1930: A HIERARCHY OF MUNICIPAL RESPONSIBILITIES by Robert Summerby-Murray, Department of Geography, University of Toronto, Toronto, Ontario, M5S 1A1.

The 1849 Municipal Act placed responsibility for local roads squarely with township and county governments, providing a solution to the financial and political dilemma faced by the province in previous decades and answering calls for political reform and increased local decisionmaking. Rural municipal governments used statute labour and direct grants to develop road networks that met local demands. Road networks suffered, however, from competing, more glamorous municipal investment opportunities in railways and manufacturing. By 1900 the poor quality of many township and county roads spurred a re-assessment of municipal involvement in such an important infrastructure, questioning the technical, political and financial abilities of local governments to meet the transport demands of Ontario's industrializing economy. Using examples from Wellington County between 1850 and 1930, this paper traces the emergence of a hierarchy as provincial governments shouldered an increasing responsibility for local roads through the establishment of a provincial Department of Highways and a series of subsidies to municipal government. The paper concludes that this hierarchy provides an illustration of the increased dependence of municipal governments on provincial government by 1930.

PUERTO RICO: LOSING GROUND IN THE CARIBBEAN by Paul Susman, Bucknell University, Lewisburg, PA 17837.

As changes in the Caribbean and U.S. political economy occur, Puerto Rico's economy is losing ground. Attracted by lower wage conditions in other Caribbean countries, relatively labor-intensive industries have been shifting out of Puerto Rico. This capital outflow and employment loss is encouraged by U.S. policies promoting low tariff imports from the Caribbean. Simultaneously, some of the more capital-intensive industries threaten to leave Puerto Rico if the favorable Section 936 tax provisions are phased out: a constant threat from a deficit-ridden U.S. government.

This study focuses on the external threats to Puerto Rico's economy and examines some of the internal changes occurring. The main question asked is: what will happen to a small island space-economy, shaped in response to powerful foreign interests, if a significant capital outflow emerges? Of particular interest is the degree to which a disarticulation with the world economy arises, leading to a landscape reversion. For example, as new job creation drops dramatically, and as possibilities diminish for migration to the mainland, people resort to a variety of survival mechanisms typical of more underdeveloped countries. Included, for example, are growth of the underground economy and a resurgence of rural subsistence gardens. Such a landscape reversion would have the superficial appearance of Puerto Rico's space economy in an earlier period, but would have a different significance overlaid upon a contemporary society.

CAESIUM-137 ESTIMATES OF ACCELERATED EROSION IN AGRICULTURAL AREAS OF SASKATCHEWAN

by R. A. Sutherland and E. de Jong, Soil Science Department,
University of Saskatchewan, Saskatoon, Canada, S7N 0W0.

The principal objective of this study was to estimate erosion rates in three agricultural fields in the Crystal Springs area of central Saskatchewan. Redistribution of the globally deposited artificial radionuclide caesium-137 was used to estimate net erosion and net deposition within the landscape over a 30 year period. Results indicated that accelerated (anthropogenic) erosion is commonplace on arable land in central Saskatchewan, even on gently sloping fields. The net integrated sediment output from the three fields ranged from 2.0 t ha^{-1} yr^{-1} (adjusted erosion rate = 0.13 mm yr^{-1}) to 6.8 t ha^{-1} yr^{-1} (0.53 mm yr^{-1}). It is more alarming to note that between 54% and 75% of all sites sampled within individual fields had erosion rates greater than the estimated rate of soil formation (1.0 t ha^{-1} yr^{-1}). In addition, between 14% and 64% of the sites had erosion rates in excess of the arbitrary upper tolerable erosion rate of 11.0 t ha^{-1} yr^{-1}. These results indicate significant degradation of the non-renewable soil resource has occurred over the past 30 years. Land degradation by accelerated erosion would result in reductions in effective rooting depth, soil moisture holding capacity, essential nutrient stores, and would adversely effect the physical structure of the topsoil. The major reason for accelerated erosion is the practice of summer-fallowing which is commonly used in the Prairies of Canada. In this region fields are left fallow every third year when they are essentially 'bare' for a period of 20-21 months. During a fallow period, and prior to seedling emergence during a cropping year, the fields have minimal resistance to water erosion which is the dominant mechanism of sediment transport in this region. Thus, without an appropriate conservation farming response long-term sustainable agricultural production in central Saskatchewan is questionable.

CANADA'S INDIANS AND INUIT: THEIR LANDS AND RESOURCES

by Harry Swain, Deputy Minister, Indian and Northern Affairs Canada, Ottawa, Canada KIA OH4

The native population of Canada has undergone major changes in geographic location and resource exploitation since contact with invading white resource users and settlers. Over time, the contact process has fostered regionalization of native populations and created an economic class seperate from the rest of the Canddian population. This paper identifies the current native population, the origins of rights to lands and resources, the exercise of rights under current practices, self-government on lands and resources, current issues affecting Indian and Inuit lands and resource rights, and assesses the ability of the population to creat an Indian and Inuit-driven future.

CLIMATIC IMPACTS ON DEVELOPMENT: DROUGHT AND POLICY CHANGES IN MOROCCO

by W. Swearingen, Department of Geography, Colgate University, Hamilton, New York 13346.

Recent works have drawn attention to the close relationship between agricultural performance and politics in the Middle East and North Africa, where food security has become a critical issue of transnational concern. However, despite the fact that drought periodically has a profound impact on agricultural performance in the region, it has received relatively little attention. When drought is considered, it tends to be viewed as a transient phenomenon: interest declines with the return of "normal" rainfall. The paper argues that this "foul weather" perspective of drought has served to obfuscate the strong links between drought, loss of food security, political instability, and major government reactions. Morocco has been selected as a case study. The paper will briefly discuss the socio-economic and political effects of drought in Morocco. Then it will demonstrate that, at three critical junctures during the colonial period in Morocco (1912-1956), drought precipitated major shifts in government agricultural policy--each time with enduring consequences for the country. Finally, it will examine the changing relationship between drought, food security, and political stability in contemporary Morocco. It will argue that, despite the mitigating effect of present-day international food relief networks, drought has become an even more potent agent of political and economic change than in the past.

THE MODEL/CONTEXT PROBLEM AND THE EXPANSION METHOD

by Edward J. Taaffe and Emilio Casetti, Department of Geography, The Ohio State University, Columbus, Ohio 43210.

The expansion method can be viewed as addressing a significant need in both social science and geographic research. The thematic social sciences and many systematic geographers have evolved toward progressively abstract, generalized and simplified models which have become increasingly difficult to apply to complex, real-world contexts such as regions. The integrative disciplines such as geography, particularly regional geography, and history have continued to deal with these complex contexts at a relatively low level of generalization. Within geography the need for a closer relationship between spatial analysis and regional study has been recognized for some time. The expansion method provides a clear operational link between an abstract and simplified spatial model, on the one hand, and the complex realities of a region, on the other. The parameters of the initial model can be expanded by relating them to specific characteristics of the region and producing a more ramified terminal model. The resultant set of expansion equations provides a view of the way in which the parameters vary with the characteristics of the region; the terminal equation encompasses both model and regional context. Initial models derived from other disciplines may be analyzed for geographic implications by expanding their parameters either spatially or in relation to localized variables.

THE CHANGING FACE OF HOMELESSNESS: SKID ROW, LOS ANGELES, 1988-1989

by L. Takahashi, University of Southern California, Los Angeles, CA 90089-0042.

Homelessness in the U.S. cannot be alleviated without recognizing two vital concerns: the changing nature of the homeless population, and the need to improve the coping ability of the homeless. A survey was conducted for six months beginning in November 1988, interviewing over 400 homeless individuals in Skid Row, Los Angeles. The survey addressed demographics, housing and homelessness, jobs and money, services, and social ties. The homeless in Skid Row are no longer predominantly alcoholic, middle-aged, white males. Today, drug abuse is as pervasive as alcohol abuse. The population is now younger, better educated, predominantly black and male; although most are unemployed, many are actively seeking new jobs. The homeless population is composed of two groups: the "new" homeless and the "old" homeless. The "new" homeless are homeless for the first time, have been homeless for a short time, and have lived on Skid Row for a short time. Finally, the homeless on Skid Row seem isolated from both an informal social support network of peers and family, and the formal support network of service agencies which exists in the area. These findings suggest that major changes in the characteristics of the homeless population have occurred and that new strategies are needed to combat homelessness.

CHINA'S NEW SPATIAL APPROACH TO ECONOMIC DEVELOPMENT

by K.C. Tan, Dept. of Geography, University of Guelph, Guelph, Ontario, Canada. N1G 2X2.

Drawing extensively on the Chinese literature since the late 1970s, the paper will examine the new ideas related to economic regions and the spatial strategy for national reconstruction.

The new approach is a response to the requirements of the socialist commodity economy which is replacing the command economy of the first three decades, and is being carried out with vigour. It is leading to the emergence of a different type of landscape characterized by rapid development in some areas, and backwash effects in others.

DYNAMICS OF INFLUENCE OF INCOME ON INTERREGIONAL MIGRATION IN THE U. S.

by W.R.Smith, K.Tanaka, and E. Casetti, Ohio State University, Columbus, Ohio, 43210.

Most theoretical works on regional dynamics of migration incorporate the income variable as a major contributing factor, but the truism that population moves from a low to a high income region has not confirmed by empirical studies. This paper, using data at the state level in the United States, tests the hypothesis that the positive relationship between net-migration and per capita income holds at any time during the post-war period.

To test the hypothesis, temporal changes in interregional migration with respect to per capita income are portrayed and analyzed by using The Expansion Method.

The results reveal the dynamic nature of the relationship between net-migration and income. Especially dramatic changes from a positive to a negative relationship took place in the 1970s, when many geographers observed a 'clean break' with the past population flow from periphery to core. It is frequently argued that a geographical definition of a 'clean break' is ambiguous, but the results of our analysis indicate the change in the sign of the relationship betweeen net-migration and income is one of the significant features of such shift.

DETECTION OF SURFACE CURRENTS AND SEDIMENT PLUMS USING AVHRR IMAGERY by Q. Tao, Department of Geography and Anthropology, Louisiana State University, Baton Rouge, LA 70803.

Since its first development on the TIROS-N satellite in 1978, the Advanced Very High Resolution Radiometer (AVHRR) has become one of the most widely used satellite sensor system. The AVHRR satellites have frequent overpasses and one satellite passes over the same area twice in 24 hours at mid-altitudes which leads to the possibility of four observations perday for a two ssatellite system of the AVHRR. This is very useful to the studies of daily detection of surface currents and sediment plums in coastal areas.

A delta is regulated by water flow and the sediment carried by the water. Therefore, it is important to study and fully understand the processes involved in sediment transport in the deltaic system. Based on the AVHRR data in the period of a week in Louisiana coast, this paper is intended to verify the application of AVHRR data in coastal study; to determine the direction and velocity of the surface currents; and to establish the relationship between sea surface temperature and sediment loads.

Disturbance and Persistence of Sitka Spruce (Picea sitchensis) in CoastalForests of the Pacific Northwest, Alan H. Taylor, Department, University of Maryland-Baltimore County, Baltimore, Maryland 21228.

Forests dominated by Tsuga heterophylla and Picea sitchensis occupy a narrow coastal strip along the Pacific Northwest coast of North America. P. sitchensis is considered seral to T. heterophylla but descriptions of groups of P. sitchensis saplings and small trees in light gaps created by small canopy disturbances ($\leq 0.25^{ha}$) suggest that P. sitchensis may persist by gap-phase regeneration after small scale disturbance. This study combines analyses of the disturbance regime (gap size distribution, gap age distribution, the spatial distribution of gaps, forest turnover time), patterns of tree regeneration and tree growth in gaps to determine if P. sitchensis can persist under a small gap disturbance regime. Tree replacement models derived from tree replacement patterns in gaps were used to predict abundances of P. sitchensis and T. heterophylla in the next generation. Tree replacement models did not predict a decline in P. sitchensis abundance in the next generation. Gaps of 800-1000 m^2 appear large enough for P. sitchensis to persist in these forests.

THE ROLE OF PHYSICAL PLANNING IN THE NATIONAL DEVELOPMENT OF KUWAIT by Bruce Taylor, Kuwait Institute for Scientific Research, P.O. Box 24885, 13109 Safat, Kuwait.

Kuwait's National Development Plan for 1990-95 emphasizes social and economic objectives for the country: diversifying the economy, bolstering private participation in the nation's economic life, reducing dependence on expatriate labor, and developing a cadre of skilled Kuwaiti workers. Government officials intend for the upcoming revision of the Master Plan for Kuwait (the country's physical plan) to promote these same aims along with land-use and transport-related objectives.

This paper examines the relationship between the Master Plan and the National Development Plan and assesses the efficacy of physical planning in promoting the socio-economic development of Kuwait. It reviews the economic and social impacts of previous Master Plans and identifies points of conflict that can arise while trying to fulfill physical and socio-economic development needs of the country at the same time. The paper concludes that in terms of promoting the country's aims for national development, the specific land-use and other proposals contained in the Master Plan are less important than the manner in which the Master Plan is implemented. In particular the administration and financing of the "social infrastructure" — housing and related social services -- are of prime importance.

Displaying TIGER Files Using IMAGE by James R. Taylor, US Statistics & IUP, Dept. of Geography & Regional Planning, Indiana, PA 15705.

The IMAGE software system provides complete access to the US Census Bureau's TIGER files. IMAGE, can access any place in the US from US Statistics CD-Rom versions of TIGER files. IMAGE provides the capacity to view any linear feature recorded on a TIGER file, generate Census Tract and Minor Civil Division maps and overlay them. Generated tract and MCD boundary files may be used to create thematic maps from data stored on disk or by using the US Statistics FedStat CD-Rom.

GEOGRAPHY AND HEALTH PROMOTION: THE EXAMPLE OF COMMIT by S. Martin Taylor, Department of Geography, McMaster University, Hamilton, Ontario L8S 4K1.

This paper uses the Community Intervention Trial for Smoking Cessation (COMMIT) to illustrate the role of geography and geographers in the rapidly developing field of community-based health promotion research. In Canada and the United States smoking cessation programs are a major component in health promotion strategies designed to reduce mortality and morbidity rates. Towards the goal of reducing cancer mortality rates in the U.S. by 50 percent by the year 2000, the National Cancer Institute has funded the Community Intervention Trial for Smoking Cessation (COMMIT) to test the effectiveness of a combination of community-based cessation methods directed primarily towards heavy smokers (25 or more cigarettes per day), the group most at risk and most resistant to quitting. This is a multi-disciplinary and multi-centre trial involving 11 pairs of intervention and comparison sites in the United States and Canada. Fundamental to the design of the study is the hypothesis that sustained health behaviour change (e.g. smoking cessation) at the individual level depends upon changes in the community environment resulting from interventions delivered concurrently through various community channels (e.g. health professionals, worksites, voluntary agencies and media). In its conceptualization, method and policy perspective the trial exemplifies a convergence of geographic and health promotion research.

THE TEXAS HIGH PLAINS WINE GROWING INDUSTRY by Otis W. Templer, Texas Tech University, Lubbock, Texas 79409.

The long dormant wine growing industry of Texas underwent a remarkable transformation and expansion beginning in the early 1970s. Texas now has over 25 wineries scattered across the state, where only one was present before 1975. Several of the best known and most successful wineries and most of the acreage devoted to Vitis vinifera are located in arid and semi-arid West Texas, which has impressive advantages over more humid regions of the state for wine growing. Within the broader West Texas region, the most acclaimed and viable segment of the industry is centered on the South Plains around Lubbock. Here, there are over 2,000 acres of wine grapes, mainly in five to 20 acre tracts on much larger properties devoted primarily to growing the traditional cotton and grain sorghum. South Plains wine grapes are much in demand and this region also provides a significant portion of the grapes crushed by East Texas wineries. Of the five wineries on the South Plains, three, Llano Estacado, Pheasant Ridge and Teysha Cellars, are located on the outskirts of Lubbock. All three have attracted much favorable publicity and their wines have fared very well in regional and national tasting competitions. It is expected that a number of new wineries will be established on the South Plains in the next decade, and most agricultural experts predict a steady expansion in wine grape acreage to 10,000 acres or more by the turn of the century.

This paper focuses on the various environmental, spatial, economic, and legal factors which have contributed to moving Lubbock and the South Plains to the forefront of the Texas wine growing industry. It also provides an indication of prospects for the future of the wine industry state-wide.

SATELLITE DATA, GIS, AND NATURAL AREA RESERVE MANAGEMENT IN HAWAII by R. Terry, University of Hawaii at Hilo, Hilo, Hawaii 96720.

A large portion of the endemic biota of Hawaii is endangered. Conservation biologists are turning to Geographic Information Systems (GIS) to aid in planning Natural Area Reserves. One hindrance to their success in monitoring the ever-changing Hawaiian forests is a lack of current species distribution data.

Forests of koa (Acacia koa) and 'ohi'a (Metrosideros collina var. polymorpha) in Hamakua (on the northern slopes of Mauna Kea, Hawaii Island) constitute a dynamic, threatened and vital ecological area. This project produced a method for updating vegetation maps of these forests through analysis combining existing GIS and SPOT satellite data. A further goal was to assess the reliability, resolution, and expense of such a method, especially in comparison with time-consuming photo-interpretation.

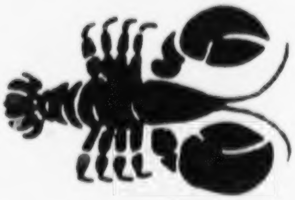
The methods successfully discriminated forests on the dominant or co-dominant canopy formation level. Classification accuracy increased with inclusion of a priori probabilities supplied by GIS data. Separate classifications of areas with heterogeneous minor associations also reduced misclassification and did not induce incompatability of results. All results indicate that large scale implementation of this procedure merits inclusion in future planning activities.

A DYNAMIC LOCATION-ALLOCATION APPROACH TO SOLVING THE PROBLEM OF EMERGENCY SERVICE SUPPLY TO DROUGHT-STRICKEN AREAS, by E.L. Tettey-Fio and N.E. Harvey, Kent State University, Kent, OH 44242-0001.

Planning for the provision of emergency services to drought-stricken regions is complicated by many human and environmental factors. These include changes in population, the differences in the quality of transportation facilities, and the dynamics of national, regional and local planning.

This paper develops a dynamic location-allocation model to deal with the problem of providing emergency services to drought-stricken areas. The model incorporates many factors such as changes in population distribution, changes in land use, diversity of cultural and political factors, and the role of international agencies in the delivery process.

The model is applied to the Republic of Kenya to provide answers to the following questions: i) What are the optimal locations for supply centers? ii) What combination of services are needed? iii) What are the optimal links between supply centers and affected areas? iv) What are the decision policies needed to achieve system-wide efficiency?



SPATIAL PRICING WITH NONCONVEX TRANSPORTATION SCHEDULES by Jean-Claude Thill, Department of Geography, University of Georgia, Athens, Georgia 30602.

The paper is developed on a model of consumer behavior in which nonconvex transportation costs are incurred. Customers can enhance their satisfaction by capturing scope economies during multipurpose, multistop shopping trips. The impact of this shopping behavior on the optimal pricing strategies of retailers is studied in a simple microeconomic model. The problem involves two competitive one-good retailers, selling partly substitutable products to a uniformly distributed population. Pricing strategies are compared for different locational patterns of firms. The analysis shows the spatial variability of the profit-maximizing price configurations. Three main factors are identified: a disposable income effect, a substitution effect, and a market area effect. Their relative importance is assessed.

AFRICAN IRRIGATION DEVELOPMENT: INVENTORY AND PROSPECTS by Derrick J. Thom, Department of Geography, College of Natural Resources, Utah State University, Logan, Utah 84322-5240.

Irrigation development in Africa has been viewed by donor agencies as a solution to recurring drought and food security for the continent. While it may be logical to assume that irrigation is the answer to increased food production and self-sufficiency, the record of successful irrigation schemes in Africa is dismal. Critics have emphasized the high cost of irrigation, poor financial returns, technical difficulties, social and environmental problems and an increased health hazard. This paper reviews the past accomplishments and future prospects for irrigation development in Africa. Irrigation development is discussed in terms of environmental, engineering, agronomic, social, economic and institutional constraints.

PORT-PLAYGROUND: THE CHANGING SYMBOLISM OF A CARIBBEAN URBAN LANDSCAPE, by Gerald A. Thomas, Geography, University of Kentucky, Lexington, Kentucky 40506-0027.

There has been a recent resurgence of interest in geographical research concerning the theorization of the built environment. Much of the debate has revolved around the interpretation of the built environment in terms of its socio-political and economic structuring of space and its ability to symbolize the increasing power and new cultural values or hegemonic projects of particular groups in society. Some argue that current changes in the landscape and architectural styles reflect the changing cultural and ideological values associated with the global restructuring of capitalism in the late twentieth century. So far, however, examples and studies have been confined to cities of developed countries. Yet the landscape in urban areas of some Caribbean islands is undergoing rapid change, as local and foreign capital begins to discover investment opportunities related to tourism within Caribbean cities.

This paper attempts to understand the underlying race/class conflict for space and identity in the capital city of St. John's, Antigua in the face of rapidly expanding tourist industry. The growth of tourism in the Caribbean is linked to "flexible accumulation" and restructuring of global capitalism. Tourism brings with it the need to transform the Caribbean urban landscape in a fashion consistent with the new cultural values of the tourist, and the prepacked image of place. This process, however, is not completely externally controlled, as changes in the local economy give rise to new groups challenging the existing power elite. The result is a complex expression of architectural styles and uses of urban space as groups attempt not only to meet the taste of the tourist, but also to symbolicly assert themselves.

PUBLIC AND PRIVATE PARTNERSHIPS: A CASE STUDY by Sharon Thomas, North Adams State College, North Adams, Massachusetts 01247.

The State of Massachusetts established the Massachusetts Urban Heritage State Park program in order to revitalize older industrial cities by fostering investment opportunities, promoting tourism, and providing enjoyment for the locals. One of the original eight parks planned in various locations throughout the state is Western Gateway Heritage State Park located in North Adams in the northwestern part of the state. The theme of the park focuses on the building of the Hoosac railroad tunnel more than a century ago. From the outset two different interests were represented, i.e., public and private. One was to serve the public and the other was for profit. One of the big areas of division has been the methods of advertising. Although the park draws many visitors, the majority come to the visitor's center which houses the extensive historic display and promotes cultural events. The audience that frequents the visitor's center is families and people interested in the history of the railroad. They are not interested in the restaurant and the shopping that is representative of the private interest. As a result the Freight Yard Pub and the few shops cater to the locals. Overall, there has been division and diversity, and the joint venture seems really not to have been mutually beneficial.

THE GEOGRAPHY OF THE "ENTREPRENEURIAL STATE": THE EXAMPLE OF PUBLIC VENTURE CAPITAL PROGRAMS IN THE USA. by Chris Thompson. Department of Geography. University of Wisconsin. Madison. WI 53706.

The growth of state-level public venture capital programs in the USA is explored as an example of new "entrepreneurial state" behavior. Some theoretical justifications put forward for government activity in this area are reviewed. Results to a survey of public venture capital program managers about the form. conditions. extent. outcomes. and problems. of currently operating examples. are presented. The focus is on: how the requirement for the state to play a new entrepreneurial role has forced a renegotiating of the previously accepted boundaries between private and public action: how the inevitable contradictions within this process have been dealt with in practice: how accommodations have varied across space: and the potential these leave for public venturing. The overall conclusion is that while the objective achievements of public venture capital programs are very impressive. the new conceptual problematics of public ownership and management which they generate have yet to be fully resolved. and will probably continue to restrict this phenomenon.

CANADIAN FLOOD PLAIN MANAGEMENT: SCALE AND EFFECTIVENESS by K.V. Thomson, Grand River Conservation Authority, Cambridge, Ontario, N1R 5W6.

The effectiveness of flood plain management in Canada is largely a function of the scale at which program delivery takes place. Although the Canadian constitution is quite specific with regard to ownership of natural resources, all levels of government from the federal to the municipal play a role in flood plain management. In the province of Ontario, conservation authorities (partnership of the province and municipalities within particular watersheds) also play a significant role in flood plain management. An evaluation of program delivery at the federal, provincial and local levels across Canada has shown that flood plain management is most effective when local commitment exists, management is able to function over an entire watershed and the responsible agency is able to implement a balanced approach of planning, regulation, and mitigative measures. The scale or level at which this has most often been effectively accomplished in Canada has been through the larger conservation authorities of Ontario.

OBESITY AND HYPERTENSION AMONG THE INUIT AND CREE OF NORTHERN QUEBEC

THOUEZ J.P., **EKOE** J.M., **NADEAU** M., **FOGGIN** P., **RANNOU** A., **GHADIRIAN** P.
Dept. geography, University of Montreal, Montréal, H3C 3J7
Epidemiology Research Unit, Hotel-Dieu Hospital, Montréal, Québec, H2W 1T8.

The prevalence of obesity and hypertension among the 8 Cree and 11 Inuit communities was established using data from a multidisciplinary survey conducted in 1982-1984.

Among the Cree sample of 909 people, 622 were overweight or frankey obese, particularly women. The weight problem appears less significant among the Inuit as 286 of 551 adults 15 years and over had a weight problem. These estimations are derived from calculation of the Body Mass Index ($W|H^2$) : a valu of 25 to 30 for men and women indicates fatness, over 30 obesity.

Arterial hypertension was measured from diastolic observations (95 mm Hg and over) and the systolic (160 mm Hg and over) for both sexes. Hypertension is more widespread among the Cree when compared to the Inuit.

The authors present some factors that contribute to explain these differences between communities and individuals.

Real Estate Analysis With GIS by Grant Ian Thrall, Homer Hoyt Institute, 1025 Thomas Jefferson St., NW, Suite 300 East, Washington, DC 20007; and San Diego State University; on leave from University of Florida.

"Location, location, location" is a Realtor's catchphrase. Pioneers in real estate research, such as Homer Hoyt, emphasized land use and urban form. But, scientific location analysis has more often been considered overly complex and not cost effective in application. Academic real estate programs have therefore focused on finance and non-spatial economics. Finance is a prerequisite for all real estate transactions and its application has no significant technological barriers. Data requirements of non-spatial economic analysis is considerably less than the spatial analysis of geography.

Now local governments are computerizing their property records. User-friendly commercial GIS software such as TYDAC's "SPANS" allows GIS to be a cost effective technology for business. Practitioners are excited about the profit potential from adopting the "spatial spreadsheet." The presentation demonstrates how GIS is contributing to bringing real estate research and applications back full circle to a renewed emphasis upon land use and urban form.

AN EMBARRASSMENT OF RICHES OR A RICH EMBARRASSMENT? FINANCIAL SERVICES AND 1992 by Andrew Leyshon and Nigel Thrift, University of Bristol, Bristol, England.

Considerable uncertainty has been expressed about the impacts of 1992 on financial services in Europe. In this paper, we will argue that these impacts must be understood within the structure of wider changes in the international financial system, and especially the restructuring of the global hierarchy of production of fictitious capital.

THE EARLY YEARS OF AMERICAN ACADEMIC CARTOGRAPHY by Robert B. McMaster, Department of Geography, Syracuse University, Syracuse, New York 13244-1160 and Norman J. W. Thrower, Department of Geography, UCLA, Los Angeles, California 90024-1524.

It is apparent that, after the introduction of formal coursework in cartography by J. Paul Goode at the University of Chicago in the early 1920s, cartography courses remained only scattered within departments of geography until the development of core programs after the Second World War. J. Paul Goode, whose major research focused on map projections and thematic atlas production, taught a series of courses in cartography and produced several Ph.D. students. Guy-Harold Smith of Ohio State University, Erwin Raisz of Harvard University and later of the University of Virginia, and Armin Loebeck of Columbia University also taught courses in various aspects of cartography. In addition to these individuals, other faculty were responsible for teaching "the" cartography class within a geography department. Such persons included John Leighly of the University of California, Berkeley, Verner Finch of the University of Wisconsin, and Richard Edes Harrison, who was associated with the Department of Geography at Syracuse University. The paper will focus on how these early developments set the stage for the rapid expansion of post-war cartography programs.

POLITICAL ECONOMY OF THE SUSTAINABLE DEVELOPMENT CRUSADE: FROM ELITE PROTECTIONISM TO SOCIAL JUSTICE by Lori Ann Thrupp, Energy and Resources Group, University of California, Berkeley, California 94720.

The concept of "Sustainable Development" has gained increasing attention throughout the world. There is growing recognition of resource degradation and the need to integrate conservation and economic development. This article addresses political and ethical issues pertaining to this "crusade" and the socio-economic implications of environmental activities undertaken in the Third World, emphasizing concerns for the poor. It suggests that conflicting groups define and use "sustainable development" in ways that embody political interests. The dominant mainstream interpretation is derived largely from the environmental movement in the North, which (although diverse) has been led by upper-middle-class privileged whites, focusing on nature preservation. The main argument here is that although this Sustainable Development movement has raised important issues, the dominant views entail disconcerting aspects, including elitism, over-simplification of the problems, neglect of political-economic causes and of social inequities in resource use -- which are sometimes imposed inappropriately in the South by Northern analysts. The paper suggests ways to overcome these problems, such as building grassroots local movements which are working for social justice and empowerment in resource issues.

POPULATION EXPOSURE TO PESTICIDE DRIFT IN SUBURBANIZED AGRICULTURAL AREAS by John Tiefenbacher, Rutgers University, New Brunswick, NJ 08903

Pesticide drift is the atmospheric transport of agricultural chemicals beyond the boundaries of the target crop during and immediately following both ground and aerial applications. The distance downwind, at which the concentration is .1 of the initial amount released, can be calculated using an equation developed by Bache, Lawson and Uk (Atmospheric Environment, 1988).

An analysis of the extent of pesticide drift onto non-farm/residential land in San Joaquin County, California, is presented in order to quantify the size of the population which may be exposed to potentially harmful chemicals. Extrapolation of concentration/exposure values to potential length of residence induces further considerations of drift as a chronic, rather than simply an acute, hazard.

An examination of some of the demographic characteristics of this population presents interesting questions for further research based on how age and class play a role in creating a particular riskscape.

MOVING UP: WRESTLING WITH THE STUDY OF HIGHER-ORDER CLIMATE IMPACTS AND RESPONSES by Peter Timmerman. Institute for Environmental Studies, University of Toronto, Toronto, Ontario, Canada, M5S 1A4.

With the arrival of climate change onto political agendas, the issue of conceptualizing, tracing, and interpreting higher-order climate impacts and social responses has become central, with immediate policy implications. Because of their intrinsic difficulty and impact research to date, the study of higher-order impacts and responses (those that are beyond linear mechanical models of how physical systems interact with social systems) is still rudimentary. Practically all studies forming the basis for international and national action are simplistic, additive, and take no account of alterations in other social parameters. They assume that "everything else will remain equal". This presentation explores a variety of alternative approaches that may allow for new research into the social dimensions of climate change, including a focus on the overall trajectory of social systems over time (including increasing or decreasing vulnerability to natural perturbation), technological innovation, social factors that have hitherto been underestimated in research (e.g. power relationships, information use), and the creation and management of sustainability.

SOME OBSERVATIONS ON FAMILY PLANNING IN INDIA by R. C. Tiwari, Department of Geography, University of Manitoba, Winnipeg R3T 2N2 Canada

By the year 2000 India is planning to reduce its birth rate to 21 per thousand, but it is estimated that the death rate would also fall to 9 per thousand. Consequently, the Overall Couple Protection Rate which was around 29% at the end of sixth plan (1984-85) is planned to be raised to 60% by the end of the century. A target, if achieved, will pave the way towards solving the population problem. This paper examines the role of mass media activities in propagating family planning so that the above mentioned target could be met. The activities include the orientation camps, outdoor publicity- including posters, paintings, films, and advertisements on television. In order to evaluate the impact of these activities on households in which either husband or wife has accepted 'family planning' by having operation were interviewed. The questions asked were:which of the advertisements were found to be most persuasive; how was the decision reached to have the operation and which of the partner should have the operation? how was the location for the family planning camp was chosen? It emerged that inter-personal contacts were the most important amongst the variables responsible in arriving at the decision to participate in family planning.

POLAR POLITICS, by Angela Tomaino, U.S. Department of State, Office of the Geographer, Room 8742, Washington, D.C. 20520

This paper addresses the factors which shape and influence the geo politics of the world's polar regions - the Arctic and Antarctic. Antarctica, governed by the 1959 Antarctic Treaty Regime, is in the process of adopting a Minerals Convention, causing the treaty system to come under some strain. The Arctic, which unlike Antarctica is sovereign territory, has also been the focus of recent discussions on the Arctic environment and Inuit rights.

Issues addressed in this analysis include the controversial Antarctic Minerals Convention, international agreements concerning the Arctic, the Antarctic debate concerning sovereignty and the common heritage of mankind, the role of science and technology, resource exploitation and the protection of the polar environments, the rights of Arctic aboriginal peoples, and strategic military considerations including the Antarctic Nuclear-Free Zone and the possibility of Arctic denuclearization. The analysis concludes with an evaluation of how polar politics will effect future cooperation.

THE URBAN FOREST AS A SINK FOR HEAVY METAL PARTICULATES BY Susanna T.Y. Tong and Pat M. Farrell, Department of Geography, University of Cincinnati, Cincinnati, OH 45221-131.

Soil and foliage samples in Mt. Airy Forest in Cincinnati were collected and analyzed for lead and copper concentrations. In addition, soil properties (such as organic matter content and soil moisture) were determined. Sampling sites were located on the outside edges as well as the middle of the forest to study the differences in heavy metal content with distance into the forest. In several sites, coniferous and deciduous foliage were compared in order to examine the variations in retainment capacities.

Analysis of variance revealed discernible reduction of foliar copper and soil lead contents with distance into the forest; a result supporting the hypothesis suggested by Lederer (1982) and others, that the trees and shrubs not only beautify our cities, but are effective particulate interceptors. This ability of forest soil and vegetation acting as a sink for particulate contamination is especially beneficial in populated urban areas where ambient pollution levels tend to be high.

PROGRAMS FOR DEVELOPMENT IN MINORITY ETHNIC REGIONS OF CHINA by Stanley Toops, Dept. of Political Science and Geography, Old Dominion University, Norfolk, VA 23529.

The People's Republic of China (PRC), a multiethnic state, is composed of 55 different ethnic groups each with different modes of economic production and different cultural characteristics. This paper analyses the programs discussed in the PRC with regard to the economic and social development of the minority ethnic areas (shaoshu minzu diqu jingji yu shehui fazhan). The primary source of information on development issues is found in journals like Minzu Yanjiu (Nationalities Research) and Zhongyang Minzu Xueyuan Xuebao (Bulletin of the Central Nationalities Institute).

This analysis is accomplished through an examination of the historical antecedents to the development program during the Reform Era. Programs in several sectors of the economy are examined with regard to development possibilities. The published information on social and economic development in minority ethnic areas is also analysed to ascertain the efficacy of development programs. A comparison is made of development 'from below' theories and values with China's policies for development in minority ethnic areas.

In summary, through an analysis of development policies set in an historical and theoretical context, the utility of the PRC's programs for the development of minority ethnic areas is portrayed

DEFORESTATION OF THE AMAZON: A BRAZILIAN PERSPECTIVE by L. Michael Trapasso, Department of Geography and Geology, Western Kentucky University, Bowling Green, Kentucky 42101.

Under the auspices of the U.S. Department of Education, Fulbright-Hays Seminars Abroad Program, the presenter was afforded an opportunity to travel extensively through Brazil during the summer of 1989. Attendance at conferences, visits to research institutes, lectures and interviews with renown social and physical scientists comprised the bulk of this program. As a climatologist, my primary aim was to investigate the issue of the deforestation of the Amazon while attempting to understand the Brazilian viewpoint of this vital issue which has become international in scope.

The Brazilian perspective is deeply rooted in their failing and corrupt economic/political system and their staggering international debts. At the same time, they have discovered a vast wealth of oil, gold and a wide variety of other minerals in the Legal Amazon Basin while the river itself has become an abundant source of hydroelectric power. It was also found that the "Debt for Nature" exchange concept is viewed as the internationalization of the forest and is totally unacceptable on all levels of the Brazilian society.

Though the forces of "savage capitalism" and the present population explosion are causing deforestation to occur at an alarming rate, some efforts have been made to curb the destruction. Legislative changes, cuts in project subsides and establishments of national park preserves have already yielded results. Public awareness campaigns and use of the media have alerted the populace to the potential environmental dangers. Economic benefits such as the riverine fishing industry and ecotourism also hold future promise.

DAMAGE TO STREAMBANKS FROM CATTLE - A CONTROLLED EXPERIMENT by Stanley W. Trimble, Department of Geography, UCLA, Los Angeles, California 90024-1524.

A controlled experiment to measure the effects of grazing cattle on streambanks was operated in the Central Basin of Tennessee during the period 1983-1989. The control stretch was ungrazed while the two treatments consisted of allowing cattle unrestricted access to (1) an unmodified stretch of stream and (2) a stretch modified by a grade control structure. Damage was (a) additional stream scour on grazed banks and (b) mechanical damage from hooves. As expected, Treatment 1 resulted in the most geomorphic work, releasing sediment at the rates of 440 m^3 per km-yr of stream while the rate for Treatment 2 was only 100 m^3 per km-yr. Surprisingly, however, the control rate was 100 m^3 per km-yr. The latter appears to be due to a series of large discharge events which allowed the normally protective vegetation to become a turbulence inducer.

THE ANATOMY OF A DELHI SLUM by Suprabha Tripathi, The University of Akron, Akron, Ohio 44325-5005.

Delhi, one of the four major cities of India, is also the national Capital. An integral part of a city, slums are the poor man's habitat. In order to discern some of the causes that leads to such a situation, a survey was conducted of a slum in R. K. Puram, New Delhi.

A relatively new slum, its existence dates back 10-15 years. Majority of people are from out of state, a large influx from Eastern India where laborers are in excess while the remaining came from other neighboring states. The slum is a predominantly Hindu one, where the people have a myriad of jobs. An enormous chunk of the people belong to scheduled castes and live in a particular section of the slum. Though most of the adults were found to be illiterate, specially among females, children are sent to school. While the women are largely self-employed and engaged in household work in the nearby apartments, men are employed in various services-peons/clerks in government offices; some own small-time businesses. Income groups varied from $30 to $110. Few, however, were found to be in the lowest income group. Day-to-day activities like shopping for non-perishables, movie theatres, medical facilities, and social call places showed interesting variations and patterns. Social call activities exhibited a distance-decay function though shopping for perishable goods is done nearby. Some households even own a TV and, therefore, do not go for social calls in 2/3 months. Transportation is in the form of buses, and cycles, the latter owned by most of the people staying in the slum.

AN ILL-CONSIDERED PACT: THE CANADA-U.S. FREE TRADE AGREEMENT AND THE AGRICULTURAL GEOGRAPHY OF NORTH AMERICA, by Michael Troughton, University of Western Ontario, London, Ontario, N6A 5C2

Modern agriculture in North America has developed not only in response to physical and market opportunities, but particularly within the framework of national policy, legislation and institutional arrangements. The latter reflect national and regional needs, seeking to reinforce strengths and safeguard areas of absolute or relative weakness. The net result, despite common antecedents and technology, is of two distinct agricultural systems, the Canadian and U.S.

The recently signed Canada-U.S. Free Trade Agreement (FTA) seems to have ignored the evolved differences, and thus threatens to precipitate major changes to the agricultural geography of the continent. Although the FTA seeks a 'level playing field', the removal of barriers and 'distortions' to trade pose a particular threat to the smaller, and inherently disadvantaged Canadian system.

This paper reviews some of the inherent and evolved distinctions between Canadian and U.S. agriculture, and examines the nature of the FTA with respect to those distinctions. Particular attention is paid to the institutional arrangements which currently safeguard large sectors of Canadian agriculture but which have been identified as 'trade distorting' by the U.S.. Possible outcomes of the implementation of the FTA are discussed, including the possibility that the systems will merge and that Canadian agriculture will occupy merely the extensive margins of a continental system.

GEOGRAPHY OF A SOCIALIST CITY - LHASA,TIBET by Tsering Tsomo,1457,Department of Geography, University of Kentucky,Lexington (KY.),40506-0027.

In recent years the attention of American urban geographers has been drawn towards the study of socialist cities. However, there are relatively few studies on the impact of socialist ideology on the Chinese and Tibetan cities. The isolation of Tibet from the rest of the world effectively precluded field studies. This paper examines the impact of socialism on the urban morphology of Lhasa, Tibet, based on archival data and interviews with scholars visiting the city in recent years.

Changes in the internal structure and growth of Lhasa between 1950 and 1989 will be discussed. In the 1950's Lhasa was a mere village, dominated by the Palace of the Dalai Lama, which was located on the summit of the Red Hill. The city was a collection of houses along a maze of narrow streets, with the bazaar situated at the east end of Lhasa. After three decades the built up area of Lhasa is now twice it's "pre-liberation" size, with the vast wasteland and marshes at the foot of the Potala Palace been transformed into a new part of the city.

Critical Geopolitics: Re-Thinking The Geopolitical Tradition and the Problematic of Geography and International Affairs

Gearóid Ó Tuathail (Gerard Toal), Department of Geography
Virginia Polytechnic Institute and State University

The recent revival of interest in geopolitics has been a limited and introverted one. In particular it has largely concerned itself with the disciplinary history of geopolitics and not with the contemporary practice of geopolitics by states in the modern world order. This paper seeks to re-think the current narrow notion of geopolitics and how the geographical in international affairs is thought of at the moment within Geography. It argues for a reformulated problematic organised around five principles: (i) that all Geography is geopolitical, (ii) that all theory and practice in statecraft is geopolitical, (iii) that classical geopolitics is an arbitrary social construction of space that seeks to pass itself off as natural and realist, (iv) that a critical geopolitics involves an engagement with discursive formations that space a certain "world" and that (v) critical geopolitics involves the study of "worlding" at a multiplicity of different sites throughout political and civil society in the modern world. These principles are brought out in the course of exploring how geopolitics is conventionally defined, how classical geopolitics works and how one might go about using post-structuralist conceptions of space to construct a critical geopolitics.

FIRE AND COMPARATIVE URBAN GROWTH: SEATTLE AND VANCOUVER, 1885-1920 by Daniel E. Turbeville, Eastern Oregon State College, La Grande, Oregon 97850.

During the late nineteenth and early twentieth centuries, Canada and the United States led the world in losses to urban fire. Existing studies of urban growth have failed to consider the effect of this destruction on urban morphology, particularly the evolution of building forms, street patterns and land use. This study compares the ways that Seattle, Washington and Vancouver, British Columbia dealt with the threat of urban fire and the effect of that threat on their respective urban morphogenesis. It is based on the analysis of detailed fire insurance surveys carried out by state, provincial and national underwriters' organizations. These are used to construct a longitudinal analysis of geographical change, which is then related to industrial, commercial and residential growth as well as changes in firefighting technology. The study suggests that, despite early morphological differences based on national culture and building traditions, both Seattle and Vancouver were responding to virtually identical building codes and fire protection requirements by 1920 due to the integration of national fire insurance firms into interlocking multinational organizations.

THE ROLE OF THE COURT IN SHAPING THE WESTERN WATERSCAPE, by Allen C. Turner, University of Idaho, Moscow, ID 83843.

Judicial allocation of a natural resource between competing interests effects the pattern of use and physical distribution of that resource. In the arid western United States, decisions by the federal and state courts have transformed nature and created a cultural waterscape visibly characterized by transbasin diversions, hydroelectric reservoirs, navigational improvements, and massive irrigation projects. More subtle but nonetheless significant are those decisions which identify federal reserve water rights on public lands and on Indian reservations. Analysis of selected court decisions reveals that the western waterscape has been shaped by narrowly defined legal issues rather than broad public policy concerns. Ninth and Tenth Circuit Courts of Appeals and the United States Supreme Court decisions affecting the Colorado and Snake Rivers provide the basis for this study.

HUMAN DRIVING FORCES OF GLOBAL ENVIRONMENTAL CHANGE by B.L. Turner II, Graduate School of Geography, Clark University.

Various national and international efforts are underway to create a coordinated research effort on the human dimensions of global environmental change to parallel the physical focus of the International Geosphere-Biosphere Program. Central to this endeavor will be the identification and documentation of the human "driving forces" of global change. Thus far, these have been identified largely through common sense and through *a priori* conceptualizations of human-nature relationships aimed at environmental issues, global or otherwise. This paper discusses the driving forces that have been widely identified as significant and marshals the evidence for each. A central theme is that the study of the human dimensions of global change must move beyond its current polemical stage to demonstrate empirically the role of each "force." It is suggested these roles will be found to vary across time and space, and that differences across spatial scales in particular will emerge as major agenda.

CANOPY REFLECTANCE MODELLING OF SEMIARID SHRUB VEGETATION by Debbie Turner and Janet Franklin, San Diego State University, San Diego, California 92182

During the last 100 years, large areas of desert grassland have been invaded by shrub communities in the southwestern United States. This transition has resulted both from natural and human-induced environmental changes, and has led to socioeconomic disruption and to poorly-understood changes in ecosystem processes (water and nutrient cycling). In this study the Li-Strahler geometric-optical model of canopy reflectance was inverted to estimate shrub size and density from SPOT satellite imagery for sites in the Chihuahaun desert shrub/grassland of New Mexico. This model treats shrubs as simply shaped objects, and multispectral reflectance of a pixel is assumed to be related to the proportions of shrub crown, shadow and understory in the field of view. The model was tested in three shrub types; creosote, mesquite and tarbush, in the Jornada Long Term Ecological Research site in southwestern New Mexico. Estimates of shrub size and density based on stratified sampling and application of the model could be used for regional monitoring of shrub invasion.

AUTOMATIC ELEVATION EXTRACTION FROM SPOT PANCHROMATIC IMAGES by W. Tyler and R. Dye, Environmental Research Institute of Michigan, Ann Arbor, MI 48107.

Elevation data were extracted from a pair of off-nadir SPOT panchromatic images of Rapid City, SD. A feature matching algorithm has been developed to provide accurate elevation estimates from SPOT satellite images.

Two scenes were selected that have the proper look-angle geometry and radiometric properties. A set of mapping transformations was developed for each SPOT scene using large scale topographic maps and a solid platform model specifically developed for the SPOT satellite. These mapping polynomials were then used to "steer" the feature matching algorithm within the raw SPOT images. Next, a set of reduced resolution images were produced for each image by aggregating the original 10 meter data to 20 meters, 40 meters, etc. The feature matching algorithm is used to locate zero crossings between a pair of images which have been processed with a Laplacian filter. The disparity between the two zero crossings is stored in a temporary output file. This process of locating zero crossings and modifying the disparity file is repeated at successively higher resolution. Once the disparity has been measured for the highest resolution level the data are converted to actual elevation.

A set of 60 points of known elevation were identified on the Rapid City West 1:24,000 scale topographic map. These points were compared with DMA level II DTED data and the satellite-derived elevations. It has been found that the satellite-derived data more closely match the topographic map than the DTED data.

CARTOGRAPHY IN SILK AND WOOL, by Judith A. Tyner, Department of Geography, California State University Long Beach, Long Beach, CA 90840.

In the late 18th and early 19th centuries embroidered maps were popular needlework projects in the British Isles and in North America. Because many of these maps were products of schools and served the dual purpose of teaching needle skills and geography skills to young girls, they were lumped with samplers by historians of needlework and ignored entirely by cartographers.

It appears that these maps had their origins in Great Britain and diffused to North America where they were less common. There are three main types of such maps--teaching aids, records, and purely decorative pieces--and their makers, purposes, and source maps differ.

This paper focuses on embroidered maps of the British Isles and analyses the three types. The analysis is based on an examination of embroidered maps in several collections, including the Victoria and Albert Museum, the Royal Geographical Society, and Gawthorpe Hall.

TRANSFORMATION OF PRODUCTION AND MARKETING RELATIONS IN WESTERN ILLINOIS AGRICULTURE, 1950-1989 by Frances M. Ufkes, Department of Geography, University of Iowa, Iowa City, Iowa 52242.

This paper examines the changing social relations of agricultural production in Western Illinois, historically the core region of feedgrain-cattle/hog production in the state. This paper focuses on the changing structure and organization of livestock production and marketing in Western Illinois, situating these evolving social relations within the context of the restructuring of the U.S. meatpacking industry. Specifically, this represents a movement away from indirect marketing forms and the rise in scale of direct marketing strategies. Given structural and locational changes evident in the U.S. meatpacking industry, new marketing strategies and production relations are evident in the Illinois cattle and hog sectors. Emphasis is given to differentiation of the class structure in Western Illinois agriculture and the social and political implications of marketing relations such as forward contracting, futures contracts, and contract farming which are evident in this area. These production and marketing strategies are examined as differing forms of labor control.

DEVELOPING POPULATION PROJECTIONS by H. Upmeier, Institute for Public Policy and Business Research, University of Kansas, Lawrence, Kansas 66044.

Population projections at the regional, state and national level are a widely requested product of demographic analysis with uses ranging from marketing research to educational, health care and governmental planning. This paper, based on extensive research on population projections for the state of Kansas, briefly reviews various population projection techniques and their limitations. It examines the cohort-component method as a technique to forecast future population by age and sex breakdown. Emphasis is placed on discussing the impact of the demographic assumptions underlying a projection. As the key forecasting variables, future migration, fertility and mortality determine the outcome and reliability of population projections. Considerable demographic, economic and geographic judgment is necessary to specify a set of reasonable assumptions on future migration, fertility and mortality for an area.

ENVIRONMENT: EVENTS, NOT AN OBJECT by Al Urquhart, Department of Geography, University of Oregon, Eugene, Oregon, 97403.

Environment is a flexible concept, in which the assumptions of its users are usually unclear. I find the use of "*the* environment" especially lacking in clarity when that expression refers simply to an undifferentiated material world that is thought to be composed of objects. The hidden assumption that accompanies this usage, which today is usually associated with recent, large-scale, human-induced changes in nature, is that a sustainable world can be attained primarily by further human manipulation of matter and energy.

However, when environment is seen as a seamless web of events, which focus on humans but which are also inevitably linked with other subjects of earthly existence, the solutions to perceived environmental problems no longer remain objective but become relational and demand different human behavior.

This paper discusses *environment* as *events* and some of the practical implications for doing so. I argue that each person's environment is a conjunction in time/space of a particular assemblage of matter, energy, and mindful information, *i.e.* an enormous series of events in nature in which each series proceeds at its own pace. As well, each person, as a cultural creature, is linked with other humans through events which are expressed symbolically. Unlike natural events, cultural events are not necessarily self-regulating. Thus to confound the self-regulating environment of the natural world with the non self-regulating environment of the cultural world will exacerbate many environmental problems facing humans today.

SOME OBSERVATIONS CONCERNING THE DISTRIBUTION OF ONCHOCERCIASIS IN SOUTHERN MEXICO. Michael Vachon, Department of Geography. The University of Texas. Austin, TX. 78712.

Black slaves accompanying Spanish colonists are suspected of introducing human onchocerciasis (river blindness) from Africa into Latin America during the 1800's. Onchocerciasis remains a serious public health hazard in Latin America with endemic zones in Brazil, Ecuador, Colombia, Guatemala, Mexico, and Venezuela. The foci in Mexico are located in the states of Oaxaca and Chiapas. Data gathered and mapped on the municipio and village level indicates a prevalence rate of 1995 per 10,000 in the major endemic zone in the Sierra Madre de Chiapas. The efforts of the Mexican Campaign Against Onchocercosis are reviewed as well as current geographic aspects of the disease in Mexico and Guatemala.

SPATIAL PATTERNS OF MARBLE TOMBSTONE WEATHERING IN WESTERN PENNSYLVANIA by K. Valimont and T. Meierding, Dept. of Geography, Univ. of Delaware, Newark DE 19716

Mean cemetery weathering rates were obtained from century-old marble tombstones for 135 cemeteries in western Pennsylvania in order to assess the relationship between industrial airborne pollutant emissions and stone deterioration. Maps demonstrate that marble weathering is as much as four times greater (2.9 mm of face recession per century) near historic industrial sites (especially Pittsburgh, Johnstown, and Altoona) than it is in the countryside 5 to 10 km away. Calcite in the marble is apparently deteriorated by reaction with SO_2, which became highly concentrated around low-smokestack, coal-burning industries, such as iron and steel foundaries, brick factories, and pulp mills. By contrast, statistical tests demonstrate that coal-fired tall-stack power plants have created little local stone damage, probably because pollutants are exported by high-level winds away from the local region.

Using integrated decadal historic employment figures for all polluting industries in western Pennsylvania (adjusted for distances from the multiple sources to a single receptor) as an index of past pollution concentrations experienced at a cemetery, it is possible to model the relationship between marble deterioration rates and estimated SO_2 inputs. A power function fit to these two variables explained 55.4% of the variance, and can be used to model changes in rates of stone deterioration over time.

THE GEOMETRY OF FRONTIERS: CANADIAN-AMERICAN CONTRASTS by James E. Vance, Jr., Department of Geography, University of California, Berkeley, California 94720.

Occupying the same quite discrete continent, Canada and the United States have so many shared characteristics that we tend to assume that knowing the nature of one country's practices, most frequently those of the United States, we pretty much understand those of the other, that is Canada's. Close relationship as often deceives as enlightens and such is the case when we come to the perception of the necessary "European occupation" of our common continent. From the very beginning in the seventeenth century, the French of the area initially called Canada and the English of the early American colonies shaped different patterns of settlement and different economic geographies; clearly that distinction has persisted between our two countries down to the present — a fact not widely appreciated. The French, by the middle of the seventeenth century, had introduced *the corridor of exploitation* as the more extensive Canadian pioneering structure: whereas the Americans (as the English to the south became) undertook more dominantly *an areally extensive spread of settlement*, characterized originally by agricultural homesteading.

Assuming that this nineteenth-century history is well known to both Canadians and Americans, this paper sets out to establish the nature of the corridor of exploitation as a distinctively North American settlement form, to demonstrate its contribution to the European settlement of Canada, and to define the actual contrast that exists because of the development of such corridors largely in only one of the two North American democracies.

CURRENT TRENDS FAVOR NATIVE AMERICAN AGRICULTURE IN ARIZONA by George A. Van Otten, Northern Arizona University, Flagstaff, Arizona 86011.

For centuries, Native Americans farmed the river valleys, desert washes, and highlands of Arizona. The ancient Hohokam and Anasazi developed sophisticated agricultural systems. At the time of European contact, irrigated fields dotted the better watered areas of the Arizona desert and in the north, the Hopi planted extensive fields of corn and other crops. During the late 19th and early 20th centuries, non-Indian settlement forced many Native American farmers to become wards of the state and only a few continued to participate in commercial agriculture. Recent court decisions, and the Arizona Water Rights Settlement Act coupled with changing economies of scale, now encourage many Indian nations to develop tribal farms. The Navajo have more than 50,000 acres under cultivation and the Tohono O'odham plan to use Central Arizona Project water to irrigate at least 30,000 acres. The Gila River and Colorado River Nations have well established farms and others, including the San Carlos and White Mountain Apache, seek to create tribal farm enterprises. Non-Indian farmers however, find it difficult to withstand Arizona's restrictive new water use regulations, escalating operations costs, and increasing land values. Therefore, many sell their farms in favor of other pursuits. If these trends continue, Native Americans will soon again dominate Arizona agriculture.

RECENT TRENDS – GANNETT AND DINWOODY GLACIERS – WIND RIVER RANGE, WYOMING

by M. Varuska, U.S. Air Force Academy, Colorado 80840, and R. Marston, University of Wyoming, Laramie, Wyoming 82071.

Glaciers contribute an undocumented amount to streamflow in Wyoming. They can be considered as natural reservoirs which store water in the winter and release it in the summer. Glacier runoff is likely to be most important during the late summer and early fall when low flows are critical for consumptive water users and instream flow needs.

Recent documented trends of Gannett and Dinwoody Glaciers show unmistakable recession. The glaciers have decreased in thickness as well as in overall size. Repeat photography of older photos dating back over 50 years shows dramatic differences in the amount of snow and ice and in the position of the termini. Volume reduction is also supported by changes in depth of snow and ice data spanning four decades. The retreat of the glaciers' termini for the same time period can be traced from plan view maps drawn from aerial photographs.

The reduction in volume of Gannett and Dinwoody Glaciers, two of the range's largest glaciers, represent a negative trend throughout the Wind River Mountains. As the glaciers recede, the source area for meltwater is reduced and consequently, their input to streamflow. Continued reductions in glacier melt will trigger significant shifts in water use and allocation.

EXAMPLES OF THE CARTOGRAPHIC TREATMENT OF TIME AS A VARIABLE.

by Irina Vasiliev. Department of Geography, Syracuse University, Syracuse, NY 13244-1160. VASILIEV@SUNRISE.bitnet.

The representation of time on maps comes in a variety of forms: point symbols, lines, arrows, labels, distortion of shape, and color. In its methods of representation, time has been treated not much differently than other mappable variables. However, what makes time different from the other variables is the role it plays in relation to the other variables.

The aim of this paper is to provide a series of examples showing the three different basic ways in which time is treated on maps: 1) time as the base map; 2) time as the mapped variable; and 3) the combination of the previous two. From this initial categorization, there will be developed a representational framework which will allow a better understanding of the symbology necessary for the depiction of temporal information, especially in a digital environment.

FLOOD DYNAMICS OF A CONCRETE-LINED, URBAN STREAM

by: Danny M. Vaughn, Department of Geography and Anthropology, Jacksonville State University, Jacksonville, Alabama, 36265.

Brush Creek drains a 76 km^2 watershed within an intensely urbanized section of Kansas City, Missouri and eastern Kansas. A concrete-lined reach trending 6.1 km through the plaza shopping district of Kansas City, Missouri has hosted several major floods over the past ten years. Channel geometry, slope, and high water elevations were determined from field observations and measurements following a flood occurring on September 18th, 1986. Discharge was computed by indirect methods and compared to a value determined from a rating curve established by the Water Resources Division of the United States Geological Survey. Boundary shear stress, stream power, and average velocity were also computed in order to establish a quantitative relationship between sediment distribution, maximum particle size, and flow dynamics operating throughout the channel during this event. Boundary shear stress ranged from 91-96 Nm^{-2}, stream power was 546-786 Wm^{-2}, while average velocity was 5.8 ms^{-1}. These values were sufficient enough to displace concrete slabs as large as 5 m long by 4.6 m wide by 0.23 m thick weighing an estimated 12,245 kg. As the channel was basically sediment free and unscoured prior to the flood, the distribution of deposits and subsequent channel scour provide valuable evidence for potentially hazardous flood conditions throughout the concrete-lined reach of this urban stream.

STAND RESPONSE TO SPRUCE BETTLE OUTBREAK IN COLORADO SUBALPINE FORESTS

by Thomas T. Veblen, Keith S. Hadley, Marion S. Reid, and Alan J. Rebertus, University of Colorado, Boulder, Colorado 80309.

In the 1940s a spruce beetle outbreak killed most of the dominant Engelmann spruce in several National Forests in western Colorado. We examined the effects of this outbreak on stand composition, dominance, tree age and size structures, radial growth, and succession in subalpine stands of Englemann spruce, subalpine fir, and lodgepole pine.

The outbreak favored new seedling establishment of fir and spruce but not of the seral lodgepole pine. Thus, succession from pine-dominated stands towards spruce and fir-dominated stands was accelerated. The predominant response to the outbreak was the release of previously suppressed small diameter spruces (not attacked by the beetle) and the non-host fir of all sizes. Following the 1940s outbreak, growth rates of released trees increased several fold and have remained high for over 40 years. The relative increases in growth rates were similar for both species, and both spruce and fir will continue to codominate the affected stands. The changes in growth rates and population characteristics documented for the 1940s outbreak have allowed the development of methods for detecting earlier spruce bettle outbreaks.

Changes in Agricultural Land Use in Taiwan: 1983-1987.

Gregory Veeck, Geography and Anthropology, Louisiana State University, Baton Rouge, Louisiana 70803.

In 1984, agricultural planners in Taiwan initiated the six year "Rice Production and Paddy Transformation Plan" designed to reduce rice production, and increase the acreage sown to corn, sorghum, vegetables, and aquatic products. In the face of rising incomes and more varied diets, rice consumption was declining while gross output increased, resulting in huge surpluses. At the same time, demand for corn and sorghum for livestock was growing but being met by imports. This program was designed to partially correct these production imbalances without direct subsidization through increased government prices. Analysis of county-level data for this time period indicates that the project has been successful in reducing rice acreage, particularly in Taipei County, and the southern counties of Kaohsiung and Pingtung. Since 1983, the area sown to rice was reduced by more than 144,000 ha. 22 %). The research introduces possible reasons for the spatial variance in the success of the plan, and identifies those crops which have proven to be the most successful replacement crops in each location.

VICTIMS AND OPPORTUNISTS: HOW WILMINGTON'S HOMELESS MAKE DO AND MAKE OVER THEIR WORLD

by April Veness, University of Delaware, Newark, Delaware, 19716.

Most studies on the homeless focus on the problems of that population and the paths by which they may be lead out of their horrible plight. By seeing homelessness as a problem to be solved either by focussing efforts on the rehabilitation of individual and family, or by correcting the structural factors that contribute to it, many of the adaptive ways in which the homeless cope and recreate order in their lives are ignored.

In this paper both sides of the individual choice versus structural constraint explanation of homelessness are addressed. Evidence from in-depth interviews with people who have been homeless is used to reevaluate the homelessness-as-problem approach. From their stories much is learned about how the homeless in Wilmington understand their situation and strategize to use their homelessness in ways to improve their lives. Despite the fact that people have lost housing, jobs, and self-esteem, and that mental illness and substance abuse permeate the everyday world of many of those who live on the street and in shelters, the homeless do not see themselves as passive victims. Instead there seems to be a sense of vigor and savvy in the efforts of some homeless to treat their stay in a shelter as an extension of entitlement programs that were once the basic right of the poor.

FEASIBILITY OF USING NOAA AVHRR-NDVI VALUES FOR DELINEATION OF AGROCLIMATIC REGIONS OF INDIA

by G. Venugopal, Ball State University, Muncie, IN and Ashok K. Dutt, The University of Akron, Akron, OH.

National Oceanic and Atmospheric Administration's (NOAA) sun-synchronized polar-orbiting satellite data from the Advanced Very-high Resolution Radiometer (AVHRR) have been advocated for studies related to vegetation. Though this satellite is operating on several wavelengths, only the Normalized Difference Vegetation Index (NDVI) is used in this study. The NDVI is calculated from the original set of visible red (Band 1) and reflective near infrared (Band 2). This study analyzes the feasibility of using AVHRR-NDVI values and monthly precipitation data for delineating agroclimatic regions of India.

Maximization procedure was performed on the fifty two week AVHRR data (May 1985-April 1986) to form a twelve month data set. Precipitation data were collected for the same time period. Two independent principal component analyses were performed to reduce the dimensionality of the data to eight bands. An unsupervised classification procedure was performed on this data set to produce a map depicting the agroclimatic regions of India.

This map compares well with the map produced by the Indian Meteorological Department with thirty year means. However, there are few differences and they are discussed.

COURTHOUSE SQUARES OF TEXAS AND THE SYMBOLIC SENSE OF PLACE

by Robert E. Veselka, University of Texas at Austin, Austin, Texas 78712.

This study surveys the courthouse squares of Texas to establish their morphological and historical typologies. Through the use of archival materials and available maps, this research extends Edward Price's (1968) taxonomy of the central courthouse square in the United States and reflects upon the courthouse square's contribution to American urban planning.

The varied histories of Texas's 254 county seats permit an investigation of the courthouse square as an important ceremonial space which helps to determine the symbolic order of the American built environment. This survey documents the Texas courthouse square and the role of ceremonial space and symbolic order within the context of historical research on courthouse squares and recent literature concerned with symbolic landscapes and sense of place.

SOCIAL STRATIFICATION AND OCCUPATIONAL ASYMMETRY OF DOUBLE INCOME FAMILIES IN QUEBEC CITY

by G. Viaud, Department of Geography, University of Saskatchewan, Saskatoon, Canada, S7N 0W0

Certain labour force changes have had dramatic impacts on family structure. For instance, the participation rate of women aged 15 and over in Canada, increased from 38% to 53% between 1970 and 1983. In 1985, 65% of all married women were in the labour force, an augmentation of 5 percentage points over 1980's figures. But perhaps more important is the increase in numbers of double income families. Despite the increasing importance of double income families, very few studies on this subject have been conducted by geographers. In order to refine the interpretation of changing urban social stratification and residential patterns of families, a new understanding of the relationship between occupational categories and gender is required, using double income families as a basis for this interpretation.

Employing data on Quebec City for 1971 and 1981, the occupational structure of husbands is compared to that of wives in double income families. This analysis demonstrates the remarkable structural differences existing between the spouses in their occupational composition. It also serves to illustrate the role of each spouse's occupation in the social stratification of double income families in the region. Also calculated is an asymmetry index, which measures the spatial and temporal variations of the occupational "hiatus" between spouses in these types of families. From the results, it seems that the asymmetry is more pronounced in inner city neighbourhoods and for authority based occupations. These tendencies, however, seem to diminish between 1971 and 1981, supporting the hypothesis of the presence of two distinct life style in double income families.

FARM SIZE AND DISTANCE TO MARKET

by Sent Visser, Southwest Texas State University, San Marcos, TX 78666.

The maximization of per unit land rental values requires that farmers decrease intensity per acre as distance to market increases for a single agricultural type. Therefore, they must increase their farm area to realize the economies of scale that result from larger farm investments of non-land capital. These economies are likely to outweigh the diseconomies of scale associated with increased travel requirements within the farm.

If intensity is flexible, farms of a single type should therefore increase in area but not in total capital requirements, as distance to market increases. If intensity is relatively inflexible, farm size, and intensity per unit area, should not vary with distance to market. The latter case is thought to prevail. Although a positive relationship between farm areas and distance to market has been repeatedly observed in geography, it is argued that this is the result of a change in farm type. Farm types that achieve maximum efficiency at larger sizes are those found at greater distances from the market, and the areas of farms of a single type should not be a function of distance.

This hypothesis is tested via multiple regression with U.S. county data, treating New York as the central market. Farm area is made a function of distance to market, rainfall, percent of farmland area under each agricultural type, and the interaction of agricultural type and distance. Rates of change in farm area over time are also tested as a function of distance with the expectation that sizes increase more rapidly over time as distance increases. In the on-going adjustment of farming to equilibrium, responses on the margins of agriculture must be more rapid because profitable options are fewer there.

THE ROOTS OF BRAZILIAN CANDOMBLÉ: DIFFUSION OF YORUBA ETHNOBOTANY,

by Robert A. Voeks, California State University, Fullerton, California 92634

Candomblé represents the most orthodox expression of African religion in the New World. The most fundamental secrets of this belief system involve the knowledge of how to collect, prepare, and administer "the sacred leaves". This study examines the process by which Yoruba priests introduced their ethnobotanical package to Brazil during the colonial period, and the significance of this transfer to the diffusion of African religion.

Field work carried out in Salvador, Bahia indicates that a high percentage of the Candomblé ethnoflora is of Old World origin and that most of the species have retained their African vernacular names and liturgical functions. Some species were intentionally introduced by Candomblé practitioners and are to this day cultivated in fetish gardens. Others arrived as weeds and became naturalized. When introduction was less feasible, taxonomically similar Brazilian species were substituted for their African counterparts. Given the primary importance of spiritual and medicinal plants to Candomblé worship, these findings suggest that the biogeographical similarity of West Africa and Eastern Brazil facilitated the diffusion of Yoruba religion to the New World.

TOURISM AND RESOURCE-BASED RECREATION IN WISCONSIN

by D.Voeller, University of Wisconsin-Whitewater, Whitewater, Wisconsin, 53190, H. Botts, University of Wisconsin-Whitewater, Whitewater, Wisconsin, 53190, and J. B. Foust, University of Wisconsin-Eau Claire, Wisconsin, 54702.

Although recreation is a major component of the Wisconsin's economy, it does not receive the attention generally afforded to industry and agriculture. This is partly because the recreation/tourism industry is composed of numerous small operations none of which is large enough to have the political and economic clout of a major manufacturing plant or an agriculture lobby. These small enterprises must rely on larger marketing collectives at the state or regional level. One critical need identified for future recreation research, marketing, and management in Wisconsin is a micro-computer based resource-based recreation geographic information system (GIS). This paper will illustrate the outcome of a simple GIS system developed using off the shelf software and a statewide inventory of all outdoor recreational sites. The ability to combine a resource-based recreational database with a spatial data base provides a superior technology for marketing the resources of the region.

VALIDATION OF AN URBAN CANYON RADIATION MODEL FOR NOCTURNAL LONG-WAVE RADIATIVE FLUXES by J.A. Voogt and T.R. Oke, Department of Geography, The University of British Columbia, Vancouver, B.C., Canada V6T 1W5.

The urban canyon radiation model of Arnfield (1976, 1982) is validated using measurements of long-wave fluxes taken within a scale urban canyon constructed from concrete building blocks. A custom-designed traversing system allowed miniature radiometers to be automatically moved around the perimeter of a canyon cross-section thereby providing for the validation of individual model grid-points. Measured model input consists of surface temperature obtained using fine wire thermocouples, incident long-wave radiation at the canyon top and emissivity of canyon materials.

The paper presents validation results for a range of canyon height to width ratios, meteorological conditions, and model parameters. Excellent agreement between modelled and measured fluxes is obtained for points on the canyon floor and top. The agreement for fluxes at points on the canyon walls is generally good but is shown to suffer from errors in sensor orientation relative to the canyon walls. Use of the Unsworth and Monteith (1975) radiance distribution improves model performance statistics for incident and net long-wave radiation.

Errors in the modelled fluxes arising from the use of approximations to the measured surface temperatures are described. Surface temperature based approximations performed better than did approximations based upon air temperatures.

A REGIONAL SYNOPTIC INDEX FOR THE DELAWARE RIVER BASIN by Russell S. Vose, University of Delaware, Newark, Delaware 19716.

Although numerous synoptic taxonomies have appeared in the recent literature, most focus on the identification of either weather types or air mass types. Weather typing schemes search for similarities in pressure and wind fields, whereas air mass studies look for regularities in thermal and moisture patterns. While both techniques describe each day in terms of a synoptic type, little has been done to integrate the two approaches. The purpose of this investigation is to design a classification methodology which incorporates both the weather type and air mass type perspectives. The methodology is then used to detect and categorize daily synoptic events in the Delaware River Basin.

To quantify spatial variation, data from seven locations in and around the basin are analyzed. Weather typing is performed by employing surface pressure, wind direction and speed. Air mass character is described using temperature, dew point and cloud cover. All variables are collected four times daily.

Classification is accomplished through the combination of Principal Components Analysis (PCA) and Cluster Analysis. PCA is applied to create orthogonal component variables. Scores are calculated for those components explaining nontrivial modes of variation. The daily component scores are then subjected to cluster analysis. Days with similar regional synoptic patterns are grouped together.

The procedure accurately captured the synoptics of the region, as evidenced by the delineation of frontal passages, cyclonic control and overrunning. In total, thirty nine situations were defined. Precipitation patterns are strongly associated with particular synoptic situations, thus this climatology should have applications in hydrology.

"Knowledge is Power": Fannia Cohn and Workers' Education, 1917-1935 by Leyla Vural, Department of Geography, Rutgers University, New Brunswick, New Jersey 08903

Led by Fannia Cohn and others, the International Ladies' Garment Workers' Union (ILGWU) pioneered workers' education. As Executive Secretary of the ILGWU's Education Department, Cohn's strategy focused on Unity Centers which offered union members a broad range of cultural and intellectual activities. Under Cohn, workers' education sought to nurture working class solidarity, to empower women in the labor movement and to meet the emotional and social needs of workers.

With the election of David Dubinsky as president of the ILGWU, the union began to abandon this educational mission. In 1935, Dubinsky hired Mark Starr to restructure the Education Department with an emphasis on training programs for future union officers and instruction for new members. The ILGWU stripped Fannia Cohn of power.

In this paper I discuss the ILGWU's educational work between 1917 and 1935 in the context of the possibilities for women's power and progressive action in a male-controlled and increasingly moderate institution.

PERFORMANCE EVALUATION OF POLYGON PROCESSING IN VECTOR BASED GIS. by Daniel F. Wagner, Department of Geography, The Ohio State University, Columbus, Ohio, 43210-1361.

Performance evaluation is fundamental to effective design, implementation, and use of information systems. Successful strategies exist for quantitatively evaluating non-spatial information system performance. However, the spatial domain provides a more complex environment for performance evaluation.

While successful evaluation strategies for GIS do not currently exist, the Literature both calls for and describes such strategies. Ideally, such strategies should be standardized, systematic, and broad based. While a comprehensive GIS evaluation strategy is unlikely in the immediate future, the performance space of the GIS may be partitioned, and specific areas may thus be individually investigated.

This research represents an attempt to design an effective performance evaluation strategy for polygon processing in vector based GIS. Accuracy of results, as well as cost in resources are evaluated. Further, variability of accuracy and cost are investigated. Critical factors to be evaluated and parameters which (hypothetically) influence these factors are discussed.

DEVELOPMENT IN MARGINAL AREAS IN SWEDEN by L.Wahlstrom. Department of Human and Economic Geography, Box 3016, 400 10 Gothenburg, Sweden

The purpose of the study is twofold. The first aim is to discuss paradigmatical and theoretical approaches to development problems by comparing a territorial approach on local development and planning with a functional one. The second aim is to discuss development strategies in backward rural areas specially how ideas and actions taken by core groups are integrated in the municipal planning and decision making.

The theoretical approach is basically connected to the humanistic geography. Methodologically a microperspective is chosen where the starting point is the integration between development actions from above and according to functional principles on the one hand and local actions and initiatives from a territorial perspective on the other hand.

The study deals with the organisation of core groups, different phases in the mobilization process and the activities in the core groups. Furthermore it deals with municipal planning and governmental sector policies and different strategies for an integrated development.

COMPARISONS OF RESIDENTIAL NATURAL GAS AND ELECTRICITY PRICES by Richard A. Walasek, University of Wisconsin-Parkside, Kenosha, Wisconsin 53141.

Natural gas and electricity combined represent over eighty percent of the energy used in the residential sector. Prices for these two energy forms increased dramatically since 1973, but the rate of increase fluctuated over time and across space. The increased prices encouraged conservation including changed living habits and new technology.

This paper analyzes recent changes in natural gas and electricity prices within the United States. Included are differences between the two energy forms, interstate variations, and emphasis on the post-1983 period when prices stopped their rapid increase. Annual average price data from the Edison Electric Institute and American Gas Association are analyzed to yield graphs and maps of the significant differences and trends.

Results show the end of a consistent trend of natural gas prices rising faster than electricity prices. In the post-1983 period, natural gas prices declined in many areas whereas electricity prices show a mixed pattern of increases in some states and stability or declines in other states. For natural gas, Great Plains states show relatively large declines and Southern states exhibit small declines. Western states continue to have electricity price increases with New England being one of the areas with recent decreases.

URBAN HOUSING PROBLEMS AND FEDERAL HOUSING POLICIES by B.S. Waldorf, Woodrow Wilson School of Public and International Affairs, Princeton University, Princeton, New Jersey 08544.

In many countries of the Western world housing policies, in particular housing finance policies are designed at a national level. However, it is at the local level of urban housing markets that nationally designed policies are realized. It is argued that the effectiveness of national housing policies in coping with availability, affordability and quality of housing is lessened by ignoring spatial variations between and within urban housing markets. The empirical portion of the paper analyzes inter- and intrametropolitan variations in U.S. housing market characteristics, focussing primarily on supply-demand disequilibria, prices and submarket differentiation. The paper concludes with a discussion of differential housing policy impacts given the spatial variations in housing market characteristics.

LOCAL PLANNING FOR ECONOMIC DEVELOPMENT: FLORIDA'S GROWTH MANAGEMENT ACT IN PRACTICE by Betty Waldron University of Florida, Gainesville, Florida 32611.

Rapid population growth has brought increased stress to Florida's people, environment and infrastructure. The state's population ranking has climbed from 20th in 1950 to 4th in 1990. The need to manage growth was recognized at the state level in 1972 with passage of the State Comprehensive Planning Act, but it was not until the Growth Management Act of 1985 that local governments realized substantive control over local development. Varied responses to that control both reflect and encourage diverse economic development policy with little direction provided by regional and state institutions. Examination of recently completed plans of several Florida communities reflects a growing public awareness of environmental needs. A concomitant lack of state economic development guidelines and assistance precludes a truly comprehensive approach to future development. Locally based economic development, as an "endogenous" process involving individual and institutional action, is often left completely unaddressed in local governmental responses to growth management.

MULTI-SATELLITE COMPARISON USING A GEOGRAPHIC ANALYSIS AND DISPLAY SYSTEM (GADS)

Anne E. Walker and Susan A. Gray
Ph.D. Associates Inc.
4700 Keele St.
North York, Ontario
M3J 1P3

In February, 1987 the Japanese MOS-1 satellite was launched carrying three sensors covering the visible, infrared and microwave portions of the electromagnetic spectrum. Under special agreement, Canada was able to acquire MOS-1 data from tracks over Canadian regions. A collaborative project (CCRS, AES, Ph.D. Associates) has been under way to compare MOS-1 MSR microwave data with data from the US Navy satellite DMSP microwave radiometer SSM/I for tracks over the Canadian prairie region for selected dates in June - October 1988 and February - March 1989. Hydrologic parameters (i.e. snow cover, soil moisture) will be examined using existing algorithms developed for SSM/I data and ground-truth information, such as snow surveys. Since the MSR and SSM/I data sets are both latitude/longitude tagged, display, intercomparison, and analysis procedures will be performed on a simple GIS-like system called GADS. This paper will present the results of this investigation, with emphasis on the application of GADS to the analysis and comparison of multi-satellite data sets.

MOS-1 VTIR infrared data will be added as a third satellite data set to this project with intercomparisons being made between the passive microwave and infrared information to determine how complementary they are. Since the VTIR data are in raster image format, part of the project will involve the incorporation of this data format into the latiude/longitude based GADS system.

DEVELOPING THE CONCEPT OF LOCALE: EXURBAN LOCALITY IN TORONTO'S URBAN SHADOW by Gerald Walker, York University, Downsview, Ontario, Canada M3J 1P3.

Central to the structuration perspective of Giddens has been the reassertion of the importance of place in the form of locale. Unfortunately the structuration notion of locality has not been theoretically developed. This paper will attempt to articulate the minimum elements and relationships necessary to make locale an operational idea and will then apply the concept to a zone of residential privelege in the urban shadow of Toronto in Canada.

Locales are initially time-space settings for interaction and routinized social practices. Giddens development of the idea, however, is not dynamic and does not involve a feedback relationship to the further constitution of social action and practice. Development of the locale idea has been scattered in the recent critical literature in geographic theory. Locales minimally must contain elements of social interaction, social interests and consciousness of place as a consituent part of the locale. These elements are the core of distanciation in local space. Further, it is critical to specify both the scale of locale and the kinds of internally differentiated spaces. Finally, locales are fluid entities existing in the larger context of the differentiation of capital and labour.

A small case study from the Albion Hills, north of Toronto, will be presented to illustrate several of the elements and dynamics of a geographic strucurationist view of locale. Data from 1974 and 1989 will be compared in the development of this priveleged residential area.

DEFORESTATION PROCESSES IN INDONESIA by Robert Walker, Florida State University, Tallahassee, Florida 32306-2050.

This paper presents results of an empirical analysis and a conceptualization of processes of forest degradation under the system of concession logging. First, inter-provincial population movements in Indonesia are examined, as are projections of demand for tropical hardwood from Southeast Asia and production levels in Indonesia. On the basis of this presentation, an attempt is made to determine near and mid-term pressures on the Indonesian forest. The paper then provides a formal treatment of forest conversion processes germane to both Indonesia and other countries awarding forest utilization contracts. A model of land use conversion resulting from logger-forest farmer interactions has appeared in the literature. This model, however, suffers from several weaknesses that limit its utility as both an explanatory device and an instrument for policy formulation. The present paper offers a criticism of this model, which is wholly deterministic and relies on an unrealistically long planning horizon for concession loggers. A new model is presented, in which forest exploitation is conceptualized as a decision process confronted by uncertainty. Conditions under which forest is preserved are developed, as is the explicit relationship between contract forfeiture and deforestation. An important category of costs omitted from the deterministic model, namely those involving exclusion of forest farmers from concession tracts, is introduced into the present formulation. The paper concludes with an application of this formulation to the Indonesian Selective Logging System.

THE ROLE OF FOREIGN AID IN THE NICARAGUAN ECONOMIC TRANSITION by David Wall, Department of Geography, University of Iowa, Iowa City, Iowa 52242.

With the Nicaraguan economy on the verge of collapse, the role of foreign aid has assumed unprecedented importance. Nicaragua has passed through three phases of international aid during the ten years of Sandinista rule. The first phase (1979-1982) consisted of aid from a variety of sources to rebuild the country after the war of liberation. The second phase (1982-1987) witnessed an increasing dependence on the socialist bloc countries, coupled with increasing need, a result of war damages and the U.S. economic blockade. The third phase (1987-present) is characterized by a winding down of the war, an economic crisis brought about by falling production and hyper-inflation and changing political and economic conditions in the donor countries. Based on interviews, official government documents and research published in Nicaragua, the role of foreign government financial aid in the Nicaraguan economic transformation is examined. Both the role of foreign aid and the economic planning strategy employed by the Sandinistas is questioned. The continuing economic crisis raises new questions about the economic transition in Nicaragua. Much of Nicaragua's economic future depends upon the results of the February 1990 elections and rapidly changing conditions in the Soviet bloc countries.

ECONOMIC AND PERCEPTUAL DIMENSIONS OF CANADIAN AND AMERICAN TRAVELLERS' SOUVENIR PURCHASES by G. Wall, Department of Geography, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada.

Most statements of visitor expenditures include information on transportation, accommodation and food as separate items, and commonly group other expenditures in an "other" category. However, there are good reasons for devoting more attention to "other" expenditures for there are a variety of problems associated with encouraging increased expenditures on the first three items. The "other" category, which includes souvenirs and other shopping purchases, is constrained only by the discretionary incomes of visitors and the availability of items to sell. Thus, there are sound economic reasons for devoting greater attention to "other" purchases.

At the same time, the nature of the souvenirs which are purchased provides an interesting perspective on the character of place. Particular types of souvenirs may be identified with particular locations and, an appreciation of the types of souvenirs which are sought and the reasons for their desirability, may provide an entry into tourists' images of destination areas.

Economic and perceptual dimensions of tourists' "other" purchases are illustrated through an analysis of surveys undertaken on the north shore of Lake Superior. Interviews were conducted with tourists and with entrepreneurs selling items to tourists. Emphasis in this presentation is placed upon similarities and differences in the perceptions and purchases of Canadian and American travellers.

AN AGRICULTURAL RENAISSANCE IN NEW ENGLAND? by William H. Wallace, The University of New Hampshire, Durham, New Hampshire 03824.

The century-long decline of New England agriculture slowed and then reversed after 1969. This trend reflects strong contrasts among the region's agricultural systems. Livestock farming remains dominant but its two principal components, dairy and poultry farming, have experienced continuing declines. Despite a sharp decline in traditionally-dominant potato production, crop farming has grown, primarily because of expansion in "new" intensive types of horticulture: vegetable, fruit and nursery farming.

Within the region patterns of growth or decline reflect the balance between "new" and traditional agriculture. Growth has been most conspicuous in eastern Massachusetts and eastern Connecticut. Generally these areas are proximate to places undergoing rapid suburbanization but not so close as to be devoured by development. Growth is also conspicuous in a few more remote areas in northern New England where amenities have attracted large numbers of newcomers. Growth is more conspicuous in places where so little of traditional agriculture remains that its continuing decline does not dominate regional trends.

Agricultural decline continues in much of western Vermont, in northern New Hampshire and in interior Maine. These are the areas most fully committed to traditional types of agriculture and they are also remote from the stimuli of vigorous population and economic growth. Agriculture is also declining in counties undergoing rapid suburbanization.

Viewed from another perspective, the growing role of intensive market-oriented types of farming reveals an agricultural pattern increasingly responsive to the impact of location rent. Some aspects of growth also reflect the "gentrification" of the countryside.

TOPOGRAPHIC IMPACTS ON SNOW-AVALANCHE PATH CHARACTERIZATION THROUGH TM AND SPOT DIGITAL ENHANCEMENT TECHNIQUES by Stephen J. Walsh, University of North Carolina, Chapel Hill, NC 27599-3220 and David R. Butler, University of Georgia, Athens, GA 30602.

In 1987 and 1988 snow avalanche paths in eastern Glacier National Park, Montana were identified, mapped, and indexed through a combination of field techniques, topographic maps, and aerial photographs. Spatial and morphometric information collected on each of the 121 paths were organized within a Geographic Information System (GIS) framework for comparison to processed remote sensing and digital terrain information. Paths were sorted by the primary spatial controlling function: topography, lithology, and structure. Statistical models were developed that related morphometric variables to locational controls.

A 1:24,000 base-scale digital elevation model (DEM) was processed through the Triangulated Irregular Network (TIN) approach to relate morphometric characteristics of paths to local and regional terrain conditions. Landsat Thematic Mapper (TM) and SPOT multispectral (XS) digital data were individually enhanced and collectively integrated to enable the delineation of paths regardless of orientation and dimensionality of the paths. Ratio and spatial filters were found to reduce terrain impacts on path recognition by diminishing the affect of shadows and by increasing the spectral contrast between paths and residual covertypes. Vegetation indices were employed to assess levels of path revegetation, suggestive of avalanche frequency, and to distinguish paths from surrounding phenomena.

THE GEOGRAPHY OF THE EUROPEAN DREADNAUGHT RACE by William D. Walters, Jr., Department of Geography-Geology, Illinois State University, Normal, Illinois 61761

The launch of HMS Dreadnaught in 1906 is commonly viewed as marking a major acceleration in the naval arms race which was one of the underlying causes of World War One. In fact, by 1906 European shipyards were already working at near maximum capacity on naval construction and the naval armaments race had been going on at least since the late 1880s. Viewed geographically, this arms race has several features which are similar to the patterns seen in more recent weapons systems production. Internationally, it involved both the transfer of weapons systems and more importantly, the spread of the capacity to produce these weapons systems from innovating states to states who were anxious to upgrade both actual naval power and international prestige. Internally, the selection of the locations for warship construction was often a highly political process and was sometimes characterized by the acceptance of less than ideal construction sites in return for local support of expanded naval production. A series of maps showing the location of European battleship production illustrates the scope and extent of the naval arms race from 1884 to 1914.

SIMULATION OF COASTAL ZONE COLOR SCANNER SUBARCTIC LANDSCAPE OBSERVATIONS, by C.L. Walthall, T. Mulhern, and S.N. Goward, Department of Geography, University of Maryland, College Park, MD 20742.

Field studies conducted in Quebec-Labrador, Canada, have demonstrated that specific botanical elements which comprise the boreal forest-tundra ecotone (such as lichens, mosses, and green, vascular plants) uniquely reflect solar radiation. The Coastal Zone Color Scanner acquires measurements which should permit the mapping of dominant, spectrally unique vegetation types characteristic of this landscape. However, verification of the sensitivity of the Coastal Zone Color Scanner to such subarctic landscape variations has not been established. Simulation of the vegetated subarctic surface, using ground surface spectral data acquired from a spectroradiometer, has been undertaken to ascertain the validity of this satellite remote sensing approach to the mapping of boreal forest-tundra ecotone. The simulation of the subarctic landscape is compared to Coastal Zone Color Scanner observations acquired over eastern Canada, with final comparison being made to a photoreconnaissance-based map of the physiognomic vegetative cover of the Labrador-Ungava Peninsula.

OPTIMIZATION OF COAL TRANSPORTATION IN CHINA by C.K. Leung and Jixian Wang, Department of Geography & Geology, University of Hong Kong, Hong Kong

This paper is to exlore for methodsfor guiding the efficient allocation and transportation of coal in China. Under the centrally planned economy of China, some commodities are controlled and distributed restrictively according to certain pre-set allocation plans. These include the raw materials and capital goods vital to national production and construction, which are regarded as "allocated goods". For these kinds of goods, there exist no guidelines for or indicators of optimal allocation and transportation.

To solve this problem of optimization, coal is chosen as the object of study. Series of models are established to indicate the Possible Market Area of the coal produced in the province of Shanxi (PMASC). Two network flow algorithms, the Shortest Path Algorithm (SPA) and the Out-of-Kilter Algorithm (OKA), are jointly employed in this modeling work. Through the comparison between the shadow prices from the OKA and the delivery price of Shanxi Coal from the SPA, the PMASCs of different sizes and patterns are found as the constraints of the models vary. These constraints are the capacity of each transport line, the coal supply at each production center and the coal demand at each consumption center.

This method provides a tool for the planners in China to examine the efficiency of an actual flow pattern or to construct a possible market pattern of a certain kind of goods from a given area under assumed conditions.

"MULTIVARIATE METHODS COMPARISON IN THE DIGITAL ANALYSIS OF URBAN TREE COMMUNITIES" by Su-chang Wang, University of New Orleans, New Orleans, LA 70148.

The paper aims to compare the principal components and the clustering analyses for various levels of digital generalization, using urban tree communities analysis as a case study. The study uses Landsat Thematic Mapper data of channels 2, 3, 4, and 5. The study area is New Orleans Metropolitan Area.

The principal components analysis is mainly based upon correlation coefficients, which are calculated from the second moment about the mean. The transformation of the original values to the differences from the mean values reduces the range of the values and makes the discrimination more difficulty. On the other hand, the hierarchical clustering analysis calculates the interdistance matrix between each pair of pixels across channels. The procedure does not involve transformation and retains the integrity of the data values in classification. The clustering analysis thus can provide highly accurate classes at a detail scale.

CONSCIOUSNESS, SPATIAL SCALE, AND THE LOCALITY DEBATE by Barney Warf, Dept. of Geography, Kent State University, Kent, OH 44242

Two traditions of political economy and social theory have dominated the emergence of the "new" regional geography. The first comprises a "bottom up" approach informed by structuration theory and emphasizes the creative, conscious actions of individuals in the creation of places. The second line of thought has viewed localities from a "top down" perspective, stressing the changing spatial division of labor, industrial restructuring, and the global system, topics about which structuration theory has been largely silent. A reconciliation of these two approaches is possible through a theory of place that acknowledges the differing importance of conscious action at different spatial scales. At the level of the locality-- of neighborhoods and everyday life-- individual behavior and consciousness are central to an understanding of the reproduction of local social relations. At successively larger spatial scales encompassing broader expanses of territory, however, the explanatory emphasis necessarily and progressively shifts to "structural" issues such as capital flows, the State, and the international system. This view does not deny the need to view both sets of issues as mutally pre-supposing; it suggests a methodological convenience. Thus the conceptual necessity of "bracketing" structure or agency is itself spatially variant.

ESTIMATING AND ANALYZING ERROR IN DIGITAL MONITORING OF SHORELINE CHANGE, by Mark S. Warren and Gregory A. Plumb, Department of Geography, University of Oklahoma, Norman, Oklahoma 73019.

Reliable monitoring of shoreline erosion plays a vital role in effective management of public lakes and reservoirs. Because of the detail and consistent historical record provided, aerial photography has proven to be the superior data source available for studying extensive areas of shoreline. To date, most studies have relied on photomechanical scale matching of several years of air photos and then overlaying shoreline features to reveal changes in their locations.

Unfortunately, a rigorous assessment of locational accuracy has been lacking in this approach. This may be due in part to difficulties inherent in estimating error by analog means. Alternatively, a digital data environment is more amenable to the sampling methods and statistical tests needed for evaluating the accuracy for monitoring shorelines with aerial photography.

Our study relies on a vector-based system to conduct a two-stage analysis of shoreline change. In one stage, sampling algorithms are applied to shoreline features digitized from air photos taken over the 25-year history of Eufaula Lake, Oklahoma. Statistical tests are then applied to the data set in order to determine degree of locational error for each shoreline feature, enabling the detection of significant changes in shoreline position over time. The other stage of the study involves decomposing total error into its component parts in an attempt to minimize error and establish a reliable and replicable methodology for monitoring shoreline erosion.

SOCIAL DEMOGRAPHIC CHARACTERISTICS OF LONG-TERM IMMIGRATION TO THE UNITED STATES: 1983-1986 by E.P. Kraly, Colgate University, Hamilton, New York 13346 and R. Warren, U.S. Immigration and Naturalization Service, Washington, D.C. 20536

Long-term immigration to the United States is estimated for 1983 through 1986 using definitions of international migration recommended by the United Nations Statistical Commission. These estimates are compared to INS data on annual immigrant admissions. The analysis also compares the social demographic composition -- age, sex and intended place of residence -- of annual immigration streams by country of origin using alternative measures of long-term immigration. This research produces new data on international migration to the United States and addresses the general issue of whether alternative estimates of long-term immigration based on UN concepts imply migration streams with social demographic characteristics that are different from those profiles emerging from official statistics on U.S. immigration.

THE KOREAN IMPRINT ON THE JAPANESE URBAN LANDSCAPE by William H. Warren, University of Hawaii, Honolulu, Hawaii 96822.

Japan is one of the most homogeneous societies in the world, but it contains several small minority populations. The Koreans are the most numerous of these groups with about 680,000 living in Japan. Most of the Korean movement to Japan occurred between 1910 and 1945 when Korea was under Japanese rule, a time when Koreans provided a cheap source of labor for growing Japanese industries. Since World War II, Korean livelihoods and living standards have diversified and improved to some degree, however, this population still suffers from significant racial discrimination and faces an uncertain future.

Today the Korean population is highly concentrated in urban areas, with the largest community being in Osaka. This research explores the imprint of the Korean population on the Japanese urban landscapes of Tokyo, Osaka, Kyoto, and Nagoya. These subtle landscapes are usually found in neighborhoods well off the paths of foreign tourists and business people, and consist of cultural signatures or motifs that lend a sense of Korean identity to these areas. Signatures range from the use of Han'gul (Korean phonetic writing system) on signs, stores, and businesses; to stores selling Korean food or clothes; and to the presence of Korean restaurants of religious institutions. Finally this research will investigate the linkages between the Korean landscape and the broader social, economic, and political forces in Japanese society.

HYDRAULIC GEOMETRY IN THE SANGRE DE CRISTO RANGE, COLORADO by Adrian A. Wasserman, Eastern Kentucky University, Richmond, Kentucky 40475-3129.

The concept of hydraulic geometry is well-established for lowland streams flowing through fine-grained alluvium. An increase in discharge produces a systematic increase in width, depth, and velocity of flow.

The results of this study suggests that the concept is also applicable to mountain streams. However, the nature of the hydraulic geometry relationships differ appreciably from their lowland counterparts. Such differences are attributed to the influence of coarse-grained bed material on the hydraulic properties of streamflow.

Eight streams were selected in the Sangre de Cristo Range: four on the west flank and four on the east flank. Measurements were made at 96 cross-sections. The cross-sections were grouped according to the origin of bed material: till deposits, outwash deposits and material derived from mass-wasting processes. Measurements at each cross-section include the width, depth, and velocity of flow, slope of the water surface, and bed material characteristics.

GIS OR GKS: PHILOSOPHICAL AND PRACTICAL CONSIDERATIONS by Nigel M. Waters, Department of Geography, University of Calgary, 2500 University Dr. N.W., Calgary Alberta, Canada T2N 1N4 bitnet: Waters@uncamult.

Differences between information and knowledge are discussed in the light of recent comments by Roszak and Pagels among others. The debate is related to the traditional GIS through a consideration of theory generation, intelligent databases, modelling procedures and the use of neural nets. The question of whether theory generation is possible within a GIS framework is considered. Special attention is paid to spatial theories. The use of intelligent data bases for accessing information within a GIS is discussed and the pioneering work of Pazner and others is extended. Modelling procedures have been either absent from many low cost and commercial GIS or are simplistic and primitive and do not build upon the rich heritage of modelling research within the discipline. Suggestions are made for incorporating past research from this field. At the present time the computationalist viewpoint reigns supreme over the connectionist. There is minimal work on the use of neural nets for geographical applications despite extensive research in cognate disciplines. Some pioneering efforts have been made by Phipps and much is implicit in the research of White. If GIS are to be truly useful for solving meaningful problems in the real world, and for solving problems of continuing interest to a wide range of geographers, then all four of these important topics will have to be more fully addressed. If these topics are pursued the current furore over the intellectual content of GIS research will likely become more muted. Such upgraded systems might then be better labelled as Geographic Knowledge Systems.

WHERE ONE STANDS DEPENDS ON WHERE ONE SITS: ENVIRONMENTAL POLITICS AND CONTEXTUAL DECISION MAKING by Marvin Waterstone, Water Resources Research Center, University of Arizona, Tucson, AZ 85721

A relatively long-standing debate has been waged within the social and behavioral sciences concerning the basis for human decision making. This debate has been characterized in a variety of ways, including the role of structure vs. agency, markets vs. hierarchies, and others. The pre-dominant axes of contention have been between the individually-based paradigms (particularly economics in its many forms, i.e., neoclassical, resource economics, public choice, institutional economics) and the more collectively-based paradigms (particularly political sociology and organizational theory). In the view of the former, decisions are based primarily (if not entirely) on self-interested utility maximization (defined as net benefits over net costs, usually calculated on a monetary scale). In the view of the latter, decisions are based primarily (if not entirely) on organizationally-defined norms and values.

Recently, a small, but growing literature has been developing which attempts to bridge these orientations. This research endeavors to characterize decision making as an embedded, or nested process. It is working toward a better understanding of the contextual nature of human behavior and decisions.

This paper will present both theoretical formulations of this new approach as well as case study results from recent applications in the area of institutional innovation in water resource management.

SOCIAL AND STRUCTURAL VARIATIONS IN TRANSMIGRATION SURVIVAL STRATEGIES: SOME ILLUSTRATIONS FROM SOUTH SUMATRA, INDONESIA by John F. Watkins, Thomas R. Leinbach, and John T. Bowen, Department of Geography, University of Kentucky, Lexington, KY 40506-0027

The transmigration program, whereby landless settlers are provided support in relocating from Java and Bali to the Outer Islands, continues to play a critical role in Indonesian development planning. The effort is one important way in which the government seeks to improve living standards and agricultural employment opportunities for previously landless families. However, research reveals that successful transmigrant families have developed survival strategies that include off-farm and non-farm employment to supplement cash income from allocated land. Although local small businesses and service enterprises provide sources of additional income, circulation or extended visits to regional urban places and agricultural districts are clearly part of the survival strategy.

Generalizations on this survival theme are depicted through examinations of the characteristics and behavior of transmigrant families in South Sumatra. The actions of individual families with regard to off-farm employment, as influenced by such factors as settler type, education, and family structure, have important implications for the continued development, and the success, of the transmigration program. In this "second stage" of development, older settlements must be rejuvenated in light of declining agricultural bases and employment demands from an expanding population.

REGIONAL SURVEY OF THE EFFECTS OF ENSO EVENTS ON STREAM FLOW IN SOUTH AMERICA, by P. R. Waylen and C. N. Caviedes, Department of Geography, University of Florida, Gainesville, Florida 32611.

Stream flow provides the balance between inequalities in evaporation and precipitation observed over the world's oceans and continents. When viewed as such a residual, stream flow characteristics of a region should be intricately related to conditions on the atmosphere and oceans. The origins of the El Nino - Southern Oscillation atmosphere/ocean perturbation are located in the South Pacific, thereby inpinging directly upon stream flow in South America. The range in the nature, magnitude and timing of stream flow responses is shown through the investigation of the probability distributions of variables including annual floods, mean annual flows and annual minima at various locations throughout South America are investigated.

CARIBBEAN TOURISM TRENDS by David B. Weaver, Luther College, University of Regina, Regina, Saskatchewan, S4S 0A2.

Although the Caribbean as a whole may be described as an area of rapid tourism expansion, significant intraregional variation in the patterns of tourism development are revealed when visitor arrival data and other statistical information (e.g. hotel beds, tourist/host ratio, tourism earnings, etc.) are examined for individual destinations. A continuum of tourist destination types ranging from "pre-tourism" to "post-tourism" is subsequently developed, with reference to a revised resort cycle model. The overall spatial pattern of Caribbean tourism development is also considered, as are the factors underlying the differential patterns of development within the region. It is found that the level of development is corelated with such factors as political situation, physical geography, advertising, and accessibility.

THE CHALLENGE OF THE 'POSTS' by Michael Webber, Department of Geography, University of Melbourne, Parkville, VIC 3052, Australia

Various interpretations of recent economic and social history have been proposed: the end of organised capitalism, disorganised capitalism, post-fordism, flexible accumulation and post-modernism. This paper examines the challenges posed by these interpretations to theoretical and empirical work within the Marxist tradition. It concentrates on economic changes rather than social or cultural ones.

The paper begins by examining the central themes of these interpretations and highlights the differences between them. How consistent are these interpretations? It then describes the nature of the evidence adduced by authors in support of their interpretation. The limitations of this evidence are emphasised: particularly the manner in which the theses of regulation and of the decline of mass production are uncritically adopted. Contradictory evidence and alternative theoretical positions are next provided. Finally the needs for further empirical and theoretical work are described.

AN INDEX OF PLANETARY WAVE PATTERNS FOR THE EVALUATION OF CLIMATE by Scott R. Webber, University of Delaware, Newark, Delaware 19716.

Growing concern about the changing climate necessitates the analysis of the meteorological record using methods which enhance detection of this change. The evaluation of planetary wave patterns is one useful method since changes in climate are expected to produce changes in atmospheric circulation.

A taxonomy of planetary wave patterns has been developed from height, wind direction, wind speed, and temperature data at the 700 mb, 500 mb, and 200 mb pressure surfaces over the United States. The data are transformed into a lesser number of standardized, orthogonal variables through Principle Component Analysis. The transformed variables are statistically independent, and the new data matrix is more manageable in size. Days are classified into relatively homogeneous groups by a pair of clustering routines on the basis of daily component scores. The average linkage method is used first to determine the optimal number of clusters. The means of these clusters are used as seeds in the non-hierarchical K-means procedure which reassigns days in an iterative process until the within and between cluster variances no longer change. Each cluster now represents a group of days with a discrete upper air circulation pattern.

The character of each wave pattern is described by the means, standard deviations, and other descriptive statistics of the original variables for each cluster. These statistics were mapped, and the synoptic patterns were visually analyzed and interpreted. Changes in the frequency of planetary wave patterns were found to correlate with surface temperature and precipitation data.

THE CHANGING GEOGRAPHY OF FEDERAL GRANTS TO STATE AND LOCAL GOVERNMENTS, FY81-FY88 by Gerald R. Webster, Department of Geography, University of Alabama 35487

From their inception through the 1970s, grants to state and local governments grew rapidly in their programmatic diversity and total dollar value. This rate of growth halted under the Reagan administration when federal grants to state and local governments experienced absolute per capita cuts during the former President's first term in office. As a proportion of total per capita federal outlays, grants to state and local governments fell from seventeen to fourteen percent between FY81 and FY88. The purpose of this paper is to ascertain if these allocative changes produced further alterations in the spatial distribution of federal grants to state and local governments. The central research question addressed is "who got what where and why?" This query is first examined cartographically to determine if regional patterns of distributional change in grants occurred during the study period. The second portion of this paper tests several competing hypotheses purporting to explain the distribution of grants to state and local governments. Among the posited relationships tested are the Congressional seniority, urban-rural contrasts, and income effects hypotheses. A stepwise regression model is used to judge the relative significance of these competing hypotheses. Some support was determined to exist for several of the hypothesized relationships though the strength of these influences varied depending on the fiscal year and grant division examined.

AMPLIFIED INTELLIGENCE AND KNOWLEDGE BASE SYSTEMS FOR MAP GENERALIZATION by Robert Weibel, Prime-Wild GIS Inc., PO Box CH-8040, Zurich, Switzerland.

Different approaches are available for development of knowledge base systems for the automation of map generalization. Expert systems by definition derive their power from the knowledge archived about a specific domain, and not from the utilized inference mechanisms. To date, formalized knowledge about map generalization is still scarce. Expert systems can currently achieve limited success in very narrow domains where information has been formalized. Development of detailed knowledge about generalization is therefore necessary. Many users have an urgent need for generalization functions to be included into GIS.

A more efficient approach to automated map generalization is proposed, termed amplified intelligence: key decisions default explicitly to the user, whose knowledge is amplified by a range of high-level tools to carry out generalization operations. The scope of amplified intelligence will be defined, and examples provided. The amplified intelligence approach can be used simultaneously for production work and for structured knowledge acquisition. The domain of the discussion relates to development of a system for automated terrain generalization.

RELIGIOUS SYMBOLISM IN LANDSCAPE AND LIFEWORLDS: A HUMANISTIC PERSPECTIVE by B.A. Weightman, California State University Fullerton, Fullerton, California 92634.

Religion, a cultural universal, is a vital and pervasive element of individual and societal lifeworlds. Curiosity about the cosmos, the meaning of being and fate after death has led to the emergence of numerous belief systems and associated rituals. These responses to the mysteries of existence find myriad expression in world landscapes. While a wide variety of sacred edifices, artifacts, life styles and activities is clearly evident, a focus on observable spatial patterns often fails to reveal more significant underlying meanings. Investigation into symbolism and ultimately the deeper meanings of both tangible and intangible aspects of religion in experiential landscapes can disclose a new perception and appreciation of the paramount importance of religion as fundamental to an ordered existence.

SATELLITE (AVHRR) TEMPERATURE MEASUREMENTS OF UPPER MISSISSIPPI RIVER POOLS by R.Weinkauf and P.Stoelting, University of Wisconsin-La Crosse, Department of Geography & Earth Science, La Crosse, Wisconsin 54601.

Remote measurement of temperature, long operational in atmospheric and oceanic environments, can now be accomplished in riverine environments. This paper documents the procedures required to detect, measure, and verify brightness temperatures of selected pools of the Upper Mississippi River System (UMRS). The Advanced Very High Resolution Radiometer on NOAA 11 was the source of data for the investigation. Full resolution (1.1km nadir) channel 4 thermal infrared (10.5-11.5 micrometers) data acquired on 30 June 1989 at 318 local time were analyzed on the McIDAS system at UW-Madison. A matrix of fourteen lines by twelve columns was positioned over Pool 9 (located north of Prairie du Chien, Wisconsin) of the UMRS. Brightness temperatures of the forty-seven "pure" water pixels range from 19 degrees (C) to 21 degrees (C). Those values were compared with a power company 3:00 a.m. reading of 23 degrees (C) and a Daily Weather Map recording of 19 degrees (C) at 7:00 a.m. Considering that no adjustments have been made for emissivity or atmospheric attenuation, the 2 to 4 degree (C) difference in these readings indicates that remote measurement of temperature is indeed possible in riverine environments. Work is now going forward to routinely access AVHRR thermal data and to incorporate adjustments for atmospheric attenuation to improve the accuracy of the temperature readings.

FIRE RELATED FLUVIAL EROSION, TRANSPORT AND DEPOSITION PROCESSES by Frank Weirich, Dept. of Geography and Dept. of Civil and Environmental Engineering, University of Iowa, Iowa City, Iowa 52242.

Accelerated erosion following fire has long been recognized. Similarly, the increased likelihood of higher concentration transport mechanisms such as hyperconcentrated flows and debris flows in burnt areas, especially in steeper slope watersheds has also been noted. A detailed understanding of the relationship between the fire processes and the subsequent fluvial erosion, transport and deposition processes is lacking. In order to gain a better understanding of these relationships and their variability under differing conditions a series of basins in Southern California and in Northern Ontario are being studied.

Using a variety of techniques ranging from the deployment of thermocouple arrays and in-fire anemometers in conjunction with high speed data loggers; to in-fire video camera systems, a number of fires have been instrumented. The aim is to provide aerial, surface and subsurface temperature and heat flow data in an effort to characterize the general fire dynamics. The use of multiple sites within each watershed has also enabled the determination of the range in fire activity both within and between differing watersheds and environments. The selective monitoring of subsequent erosion, transport and deposition in a number of watersheds was then undertaken. Using both traditional erosion plot and surveying techniques and newer methods involving various in-channel and in-reservoir flow monitoring systems detailed data on the sediment transport processes is being collected. Of particular concern are the questions of flow event initiation and flow transitions and their relationship to the earlier fire events.

STREET AND PARK TREES OF ROXBURY AND NORTH DORCHESTER: PATTERNS OF URBAN INEQUALITY by Joan M. Welch, Boston University, Department of Geography, 675 Commonwealth Avenue, Boston, Massachusetts 02215.

Collection of data on street and park trees of two neighborhoods in Boston, Massachusetts took place in the fall of 1988 and spring and summer of 1989. The data collected for each street and park tree of Roxbury and North Dorchester includes species, diameter at breast height (dbh) and condition. Data is organized by census tracts. There are 21 census tracts in Roxbury and 24 in North Dorchester.

Calculations of descriptive biogeographical statistics for each census tract include species diversity, size class (dbh) diversity, trees per acre, trees per person, total basal area per acre, and total basal area per person. An investigation of the spatial patterns presented by the biogeographical descriptors reveals significant variations across the nieghborhoods. Further analysis connects the socioeconomic history of the neighborhoods to explain the inequities of distribution of public urban forest resources across Roxbury and North Dorchester.

TRIBUTARY INPUTS AS A MEANS OF TERRACE FORMATION by Mark Welford, University of Illinois, Urbana, IL 61801.

Detailed mapping and description of stream terrace exposures in the lower Little Salmon River Valley in west-central Idaho, suggests a complex fluvial history for the basin. Weathering characteristics suggest that the bulk of the valley fill is late-Pleistocene in age, and as many as four longitudinally discontinuous terrace scarps have been incised into this fill, and the colluvium that flanks the valley. Numerous debris-flow and water-lain alluvial fan deposits locally cross-cut and conformably overlie this fill. Terrace incision appears to be locally controlled via tributary inputs - in the form of catastrophic (high magnitude low frequency) debris flow fans. Two reaches are examined in detail to formulate reasonable scenarios for terrace formation. The stratigraphy of Emery Creek Bar suggests relations between debris-fan deposition and terrace incision, that can be evaluated in light of a historic (1974) debris flow event at Indian Creek (10 km upstream from Emery Creek Bar).

NATURE AND ROLE OF THE "GEO-FACTOR" IN PUBLIC POLICY FORMATION by Barry Wellar, Department of Geography, University of Ottawa, Ottawa, Ontario, K1N 6N5.

This presentation explores the nature and role of geographic considerations in public policy formation in the U.S. and Canada.

A secondary, yet broader purpose is to relate findings to the themes of "Sharing the North American Continent" and "Sharing the Global Village".

The terms of reference are general in all respects. The term "geo-factor" refers to any and all geographic considerations -- laws, theories, concepts, methods, techniques, knowledge, information, data, etc. Public policy formation refers to the content, process and outcomes of government initiatives at all levels. And, the spatial dimension encompasses all phenomena in the local to continental and global geo-political spheres.

Drawing on evidence from a variety of fields -- health, regional development, water, environment, urban, etc -- and practical experience with public policy formation at all levels of government in the U.S. and Canada, the following kinds of questions are examined:

1) What or what kind(s) of geographic considerations are factored into policy components or elements?

2) What are the consequences of including or not including geographic considerations in policy initiatives?

3) Why, or by what rationale, are geographic considerations factored into or out of policy information sets or policy decisions by different levels of government?

4) How or by what means are geographic considerations factored into or out of the policy formation process? And,

5) How is the geo-factor assessed as a policy variable, a policy variable attribute, or a policy decision support system feature?

OVERVIEW AND CRITIQUE OF THE NCGIA RESEARCH AGENDA by Barry Wellar, Department of Geography, University of Ottawa, Ottawa, Ontario K1N 6N5.

The research agenda of the National Center for Geographic Information and Analysis (NCGIA) is discussed in two panel sessions. Panelists include Center researchers, and participants in the process leading to the creation of the Center.

Two important purposes are served by this overview and critique of the NCGIA research agenda.

First, evidence and perceptions on the status and direction of a research project which is of current and potential interest to many geographers are presented and examined.

Topics considered by panelists include the research philosophy, issues and priorities driving the overall program, as well as the problems, questions, methods, techniques and relationships involved in research studies.

The second more expansive purpose of the sessions is to place and assess the NCGIA project -- and geographic information, analysis, and systems in general -- in their broader disciplinary, scientific, and societal contexts.

Specifically, the conference themes of "Sharing the North American Continent" and "Sharing the Global Village" refer to decisions, actions and outcomes which affect our land, water and air resources, as well as people and their institutions in the local, national, continental and global spheres.

This aspect of the overview and critique of the NCGIA research agenda is therefore expressly concerned with exploring the Center's role in bringing geographic knowledge, information, and methods of inquiry to bear on decisions and actions which have spatial consequences of a continental or global nature.

THE RECENT EXERCISE OF RESOURCE RIGHTS BY THE WISCONSIN OJIBWE by Anita Joan Wepfer, Associate Professor of Geography, West Georgia College, Carrollton, GA 30118

Since the Voigt Decision of 1983, the six Ojibwe (Chippewa) tribes of N. Wisconsin have been exercising their court-affirmed nineteenth-century treaty rights on non-reservation lands. The purpose of this paper is to discuss the exercise of these rights, which include spearfishing during the spring spawning season; bow and rifle hunting of deer (including does and fawns); bear hunting; the trapping of fur-bearing animals; the harvesting of timber; and the gathering of wild rice.

Only in the gathering of wild rice are the regulations the same for both Indians and non-Indians. Regarding the rest of these activities, non-Indians must obey State gaming laws, while the Ojibwe are governed season-by-season according to agreements reached between the tribes and the Wisconsin Department of Natural Resources. Tribal-DNR negotiations are held in closed sessions (requested by the Ojibwe, who fear disruption of negotiations by anti-treaty-rights groups) and, more often than not, have produced compromises agreeable to both sides.

This paper presents the recent Ojibwe-DNR agreements regarding the timing, location, and harvest limits of off-reservation natural resources. In addition, speculations are made on future developments, especially those regarding the sale of off-reservation resource rights by the Ojibwe to the State of Wisconsin.

EDUCATIONAL COMPUTING IN GEOGRAPHY by Bob Werner, Geography Department, Mankato State University, Mankato, MN 56001.

Geographers use computers in a great variety of ways: to make and analyze maps, create graphics, manage data, process surveys, make statistical and mathematical calculations, create information systems, process remotely sensed digital imagery, instruct, give exams, and write documents. Given that geographers use computers in so many ways, questions of educational computing are of interest.

Findings of research indicate that if the computer is used in the way a person reads a book, computing is not effective. To take advantage of the computer in education, instructional programs must anticipate how students learn, allowing for the fact that people learn in different ways. An effective instructional program has many branches that respond in different ways to different users. They are sensitive to various levels of knowledge, and present appropriate instruction. They check to see if material has been mastered, and adjust instruction accordingly. An example of unsuccessful educational computing is given, where the computer displays maps. An example of successful educational computing is given, which involves learning place names by associating other information with the place name. In this way, the student learns not just the name, but resources and attributes associated with the place. This is advantageous both to learning the name, and learning more about what attributes the place has.

THE NOTTING HILL CARNIVAL: SOME BARBADIAN LONDONERS' VIEWS by J. Western, Department of Geography, Syracuse University, Syracuse, New York 13244.

As a corollary to the growth of a significant Afro-Caribbean population in London since the 1950s, the Notting Hill Carnival has over a quarter-century become a new tradition for the metropolis, and now attracts up to one million people over the late summer holiday weekend. The notion of carnival, with bands wending their way through the streets, is originally a Trinidadian import. In the mid-1970s an element more associated with Jamaica and with younger, British-born blacks--the static loudspeaker "sound-systems" pulsing out reggae--was introduced. On the sidelines, observing, stood the third large West Indian group, the Barbadians.

Notting Hill was one of the two major settlement foci for West Indians in London during the migration years, and was a particular destination of Barbadians. (The other focus, south-of-the-river Brixton, was perceived as being more "Jamaican.") But with the passage of time many Afro-Caribbeans have moved out from Notting Hill, an Inner West London neighborhood. None of a sample of over thirty mostly comfortably-off Barbadian Londoners (two-thirds immigrants, one-third their British-born children) now lives there. As part of a broader attempt to ascertain whether they felt there were any "valued places" for West Indians or Barbadians in London or indeed in Britain, they were asked about the Notting Hill Carnival. Their thoughts reflect variously on inter-island rivalry and interracial revelry, on the police, on crowds and criminal behavior, on media portrayal, and on the changing status of a now-gentrifying Notting Hill.

UPDATING LAND USE COVERAGE IN A GIS USING REMOTELY SENSED DATA

by Sally J. Westmoreland and Douglas A. Stow, San Diego State University, San Diego, California 92182

We will report the results of an applied research project whose primary focus is to use remote sensing and image processing methods to update land use coverages in vector-coded GIS that are used for regional planning. The ERDAS-ARC/INFO "Live Link", an integration of raster image processing and vector GIS technologies is used to update these land use coverages.

Several types of remotely sensed image data and image processing/interpretation methodologies are being tested for updating land use data using the "Live Link". Image data include color infrared aerial photographs and videographs, digital orthophotographs, SPOT/HRV Panchromatic and Multispectral, and Landsat/TM digital data. Image processing/interpretation strategies have included (1) screen editing of vectors based on geocoded images or change enhanced images as a graphical backdrop; (2) automated detection and editing of land use change parcel boundaries with visual identification of land use categories; and (3) automated editing of boundaries and categories for land use change parcels.

Our analysis is based on land use changes within the Del Mar, California 7.5-minute quadrangle between 1986-88. We have achieved good results with (1) the incorporation of previous land use and community plan data into the updating procedure, and (2) a combination of change detection methods applied to multi-date SPOT/HRV Panchromatic images and land use classification of change areas using Landsat/TM imagery of the most recent date.

USING G.I.S. TO ILLUSTRATE BASIC CONCEPTS OF SCIENTIFIC MODELING,

by Douglas J. Wheeler, Michigan State University, East Lansing, MI 48824-1115

Scientists in various fields develop models in an attempt to emulate nature by manipulating a specific set of variables. Modern GIS data bases provide a tremendous boost for integrating and analyzing spatially-based variables in models. The basic components of models (e.g. elements, function, explanation, prediction) can be applied to forming and testing hypotheses in scientific inquiry models.

Theoretical and methodological models do not require the assigning of numeric values to elements nor extensive formulas to obtain results. Types of mathematical models used with GIS may include binary, weighting and quantitative models using nominal, ordinal and interval/ratio forms of data, respectively. Each type of model has its benefits and drawbacks. Theoretical and methodological models are useful to visualize relationships of elements and to aid in hypothesis formation, yet there is no way to prove the statistical representativeness of those models. Mathematical models make it much easier to replicate model results since actual numbers are involved. There may be a tendency, however, to oversimplify the processes making that system work.

With the rapid advancements taking place in GIS hardware and software, basic GIS concepts provide an ideal backdrop for learning and applying modeling techniques.

NEW YORK'S CORPORATE LINKAGES WITHIN THE UNITED STATES METROPOLITAN HIERARCHY

by James O. Wheeler, University of Georgia 30602.

This paper examines two related components of New York City's preeminence as a command and control center within the U.S. economy: the spatial ownership links (1) among major corporations headquartered in New York and their subsidiaries and (2) among subsidiaries located in New York and the location of their parent firms. Based on a competing destinations model, population size of the linked metropolitan areas was consistently the most important variable in accounting for the intensity of the ownership links. Distance between New York and the linked metropolitan centers proved insignificant or weakly significant as an impedance to ownership linkages. Likewise, the spatial distribution of the linked metropolitan areas generally had neither an agglomerative nor competitive effect on the ownership linkages. Population size is viewed as an aggregate measure of a center's corporate importance and an index of its producer service infrastructure. These results show that New York, as the leading corporate center in the United States, interacts strongly down the metropolitan hierarchy, irrespective of the location of other metropolitan centers.

FORSAKING SUGAR FOR VEGETABLES: AGRICULTURAL DEVELOPMENT IN BELIZE,

by Victoria A. Whitaker, Department of Geography, University of Texas at Austin, Austin, Texas 78712.

This paper will examine agricultural development efforts in Belize in the context of environmentally sound and culturally appropriate development. The Belizian economy is dependent on exports of sugar cane and is extremely vulnerable to volatile world market prices. Few Belizians are involved in agriculture, and much food is imported. Recognizing the strain that these conditions put on the economy, the Government of Belize has made agricultural self-sufficiency and diversification of export crops a high priority. Since Belize has not traditionally been an agricultural society, there is a pressing need to improve farming methods, to broaden the range of crops produced, and to increase overall production. This paper focuses an a small research farm in northern Belize where sustainable methods such as mulching, green manuring, crop rotation, and intercropping are used to test a variety of new and traditional crops. The farm grows both export crops and food crops for local consumption. A Mayan farmer from the local population is in charge of the day-to-day operations and demonstrates successful methods and crops to interested farmers in the area.

TRADING TOXICS: ISSUES IN THE TRANSBOUNDARY MOVEMENT OF HAZARDOUS WASTES BETWEEN THE U.S. AND CANADA

by A. White, CENTED, Clark University, Worcester, Massachusetts 01610

Exports of hazardous wastes has emerged a politically volatile issue in North-Sourth relations despite the recent Basel Convention on controlling such trade. In contrast, waste trading between the U.S. and Canada is governed under a bi-lateral agreement in effect since the mid-1980's which has functioned thus far without major revision or dispute. We attribute this to the approximately equal volumes of wastes shipped, the absence of a major accident to date, and the uncomplicated and long history of moving waste materials across the frontier. The case of Ontario demonstrates these features while revealing some of the regulatory and political uncertainties which make current arrangements vulnerable to sudden and gradual change.

SPATIAL ANALYSIS OF STATEWIDE WATER-QUALITY DATA

by D. White, R. Smith, R.B. Alexander, K. Lins, U.S. Geological Survey, Reston, VA 22092, C. Price and K. Robinson, U.S. Geological Survey, W. Trenton, NJ 08628, and S. Jenson, U.S. Geological Survey, Sioux Falls, SD 57189.

Federal law requires State governments to conduct a variety of statewide assessments of surface-water quality to aid in the design of pollution control programs dealing with both point and nonpoint sources of pollution. However, at the scale of an entire State, these water-quality assessments are often not collectively representative of statewide conditions because of biases in monitoring and extent of knowledge and are often subjective in nature. This project attempts to resolve these inadequacies by establishing a more consistent and objective methodology of statewide water-quality assessment. In particular, both vector and raster geographic information system (GIS) analysis and regression techniques are employed to correlate various water-quality conditions with information on population, land cover, topography, and pollution sources within the State of New Jersey. Stream network and drainage basins, derived from U.S. Geological Survey 1:250,000-scale digital elevation models, anchor the topology of point and nonpoint pollution sources. The network allocation procedures of vector GIS are employed to simulate the effects of distance from a pollutant source to a water-quality monitoring location. Recent land cover characterization relevant to water quality is derived from Landsat Thematic Mapper data and is augmented by U.S. Geological Survey land use/land cover data. The regression model is applied to a large and representative sample of stream segments to obtain an unbiased estimate and visual depiction of regional water quality.

ENVIRONMENTAL LEGISLATION AND ENFORCEMENT: CASE STUDIES FFROM MALAWI AND SENEGAL by Rodney White, Department of Geography, University of Toronto, Toronto, Ontario M5S 1A1-

The many aspects of the global environmental crisis have provoked various governmental responses in the form of new legislation and new government structures. Some of these responses evolved locally while others were "imported" from other countries. Whatever the source of the response, problems have always been encountered at the enforcement stage, because it is at this stage that the conflicts within a country become apparent and that the shortage of financial and human resources becomes a constraint on effective action.

In this paper the experiences of two African countries with a similar size of population (although very different resource bases) are compared. In Malawi every effort has been made to enforce existing land-use regulations in the context of environmental stress. No new departments or ministries were created. We might call this the "co-ordinating approach". In Senegal a new environmental code was enacted and a new Department of the Environment was established; we might call this the "centralised approach".

The reasons why these approaches were adopted are examined and an assessment is made of the experience to date. General conclusions are drawn as guidelines for policy-makers in other countries in similar circumstances.

THE ADOPTION OF WATER-SAVING PRACTICES AMONG HIGH PLAINS IRRIGATORS by Stephen E. White, and David E. Kromm, Kansas State University, Manhattan, Kansas 66506.

The acceptance of water-saving practices among High Plains irrigators has been a highly variable process throughout the region. This research examines the adoption of 39 practices for 10 counties in Kansas, Nebraska, Oklahoma, and Texas. The frequency of adoption for each practice was estimated from a survey of 709 irrigators. The variance in irrigator adoption of water-saving practices is primarily a function of location and secondarily influenced by number of wells, type of irrigation system, depth to water, age and educational attainment of the irrigator. Locational differences remain strong even when the influence of secondary factors are controlled. This suggests that adoption is not a spatially uniform, easily generalized process than can be quickly modeled and understood. Instead, it will require a greater understanding of the unique institutional and communication processes that occur at a local level. Likewise, efforts to encourage water conservation should be regionally specific. Broad based programs designed to enhance water conservation at the interstate or perhaps even the state level must contend with a very complex mix of current water-saving practices.

DYNAMIC SYSTEMS MODELING IN CULTURAL ECOLOGY by Thomas M. Whitmore, Graduate School of Geography, Clark University, Worcester, MA 01610.

Advances in computer technology now facilitate dynamic systems simulations using desktop computers. This general technique provides a powerful methodological tool with which to address research problems reflecting many of the major themes in diachronic cultural ecological studies (e.g., changing productive technologies and population dynamics).

Systems dynamics facilitates problem conceptualization by incorporating structured, hierarchical, and mutually interactive society/environment interrelationships. Cultural behaviors and power relations are equally capable of inclusion in such simulations, facilitating examination of higher-order structures. Specification of such models forces the investigator to rigorously examine assumptions as to the system's structure (i.e., the nature of interactions), its boundaries (i.e., what interactions are assumed to be outside the phenomena of interest), and the strength of the interactions among the variables. While this process is difficult and sometimes speculative, it pays benefits in the clarity and rigor of the resulting problem specification.

Examples using this method will illustrate its use to examine a variety of cultural ecological questions, both contemporary and historical.

GOATS AND GARBAGE IN KHARTOUM, SUDAN by Joseph B.R. Whitney, Department of Geography, University of Toronto, Ontario, M5S 1A1

In many Third World cities, urban agriculture and animal husbandry provide a valuable source of food and income for low-income families The animals also consume large quantities of ''free'' organic wastes that would otherwise be landfilled. In such cities, there is a symbiotic relationship between wastes and animals that results in net benefits both to the garbage disposal system and to the health and welfare of low income people. Hence, any change in waste management or in the animal economy has far-reaching and unforeseen consequences for both systems.

In the early 1980's, a number of European governments offered to assist Khartoum to modernize its garbage system. Since no assessment of such a proposal had been undertaken, I carried out a sample survey, together with graduate students at the Institute of Environmental Studies, University of Khartoum, of approximately 400 animal- and non-animal-keeping families to determine the impact of the proposal on the waste economy of the city. It was concluded that, although there were social costs associated with the presence of animals in the urban area, the social benefits of improved family health and income and lower garbage disposal costs far outweigh them.

SHARING THE NORTH AMERICAN CONTINENT: SOURCES, METHODS AND APPROACHES TO THE STUDY OF INTRACONTINENTAL MIGRATION DURING THE LATE NINETEENTH AND EARLY TWENTIETH CENTURIES by Randy William Widdis, Department of Geography, University of Regina, Regina, Saskatchewan S4S 0A2.

In keeping with the theme of relations and interactions between the U.S. and Canada, this paper identifies and evaluates a number of sources used by this researcher in tracing both Canadians and Americans crossing the border during the nineteenth and early twentieth centuries.

History attests to the "intermingling" of Americans and Canadians during periods of peace and prosperity. For instance, it has been estimated that over the period 1861-1931, the net migration of Canadian-born to the United States totalled 2,080,000. Yet as Bicha (1962) and others have noted, nearly one million American residents moved into western Canada between 1898 and 1914. Despite these numbers, there has been little detailed examination of this intracontinental migration as scholars have been frustrated by their inability to operate behind narrowly defined geographic and temporal boundaries.

Migration is best appreciated by a strategy that traces migration paths and life histories. My research has employed a number of different sources which allow one to penetrate the methodological barrier presented by the census and explore the pre- and post-migration experiences of Canadian and American emigrants. This paper discusses the strengths and weaknesses of genealogies, naturalization records and border crossing records, and illustrates the use of these sources with a few empirical case studies.

Meeting the Map Needs of the Blind and Visually Impaired Visitor to Washington, D.C. by Joseph Wiedel, Department of Geography, University of Maryland

The purpose of this study is to design criteria for maps for the blind and visually impaired. Much research has been carried out on symbols and tactile discrimination but very little definitive work has been done on design parameters to provide guidelines for producing maps and graphics that will meet the needs of the broadest possible range within this user group.

In surveying the users of maps and graphic materials for the blind and visually impaired it was found that, as in many map products, the user and uses are not as restricted as anticipated. In meeting these user requirements color printing, photography and a model are being used in an exhibit designed to reach the broader audience without sacrificing the specific needs of the smaller more definable group of legally blind.

The addition of color in the printing required the study of color-blindness and devising a method of selecting colors that were identifiable by subjects with varying degrees of color blindness including monochromatic vision. This was developed using the Pantone Matching System (PMS) color chips with a video camera and monochromatic monitor.

Various methods of reproduction are available that will produce both a print and tactile image. Only thermoform, however, will produce multiple elevation symbolization as well as allow for the printing of negative image type.

With the process selected and the colors identified the problem remained of selecting a plastic that contained the required properties. It must first of all be of a thickness and consistency that allows printing using a standard offset printing press. The color of the plastic must permit the accurate reproduction of the chosen colors and provide needed contrast. The texture of the plastic must be pleasant to the touch and provide a slight resistance as the fingers slide across the surface. The plastic must accept readily available inks that will take considerable handling, without rubbing off. And finally, but of extreme importance, it must have good thermoforming qualities - the image must be crisp and durable and be producible using a standard thermoform machine.

THE ACADEMICS OF ENCAPSULATION: TOWARD A PRESCRIPTIVE PARADIGM by John Wiener, C/O Dept. of Geography, University of Colorado, Boulder, CO. 80309-0260

The session thesis is that Native Americans may be forerunners in efforts to maintain the cultural integrity of encapsulated societies. Native North Americans are in rich countries with supposedly enlightened attitudes, and indigenous people retain some territory and sovereignty. Is that sufficient for cultural integrity? This thesis may offer lessons relevant to other ethnic self-assertions, because the essence of these movements is recapture of some local autonomy, in resource and production relations, and in relation to other and larger social structures. This paper will set context for the session, with an outline survey of some relevant academic approaches, including: failed efforts to separate economy and society within anthropology and economic anthropology and, the progress of cultural ecology toward political economy, and, the new syntheses appearing in development anthropology, economics, and geography. The importance of resource management and subsistence issues is emphasized in the development of the new paradigm, and the bases of a prescription for local rural development are noted. Also noted are some long-overdue rehabilitations of classic geographic ideas.

LAW (AND PUBLIC POLICY?) AND THE DEPARTMENTS OF GEOGRAPHY by Chand Wije, Department of Geography, Kent State University, Kent, Ohio 44242.

Interdisciplinary research in law and geography has over fifty years of history behind it. Its growth has been phenomenal in the U.S., especially after the mid-1970s. An increasing acceptance of law and lawyers by departments of geography, in recent years, can perhaps be a major factor fueling this development.

A survey of the Guide to Departments of Geography in the United States and Canada, indicated that in 1988/89, 23 geography departments have maintained a "law connection." If geographers' interest in "public policy" can be considered as "quasi-legal research," the support for law becomes more promising. In 1980-1981, 28 departments had 51 geographers interested in public policy research. In 1988-1989 these numbers have increased to 49 departments with 74 geographers. The paper presents the results of an analysis of "law and geography" data extracted from the Guide.

DISCREPANCIES IN THE ACCEPTABILITY OF ALTERNATIVE RIVER RATIONING POLICIES, Thomas A. Wikle, Department of Geography, Oklahoma State University, Stillwater, OK 74078.

This study examined the acceptability of alternative resource rationing policies among wild river users and river managers. The premise is that recreation decision-making can be improved by a better knowledge of discrepancies between the attitudes held by river users and those of river managers concerning the implementation of policies which limit river use.

Visitors to four separate river areas were asked to evaluate First-come/First-served, Advanced Reservation, Lottery, Price, and Merit as policies for limiting use. River managers were asked to answer identical questions. Chi-squared tests indicated that Advanced Reservation is considered to be a more acceptable policy to river users than to river managers. The findings also indicated that Advanced Reservation, First-come/First-served, and Lottery are perceived to be acceptable policies to both resource users and managers while Merit, Price and Priority for First Time Users are generally not perceived to be acceptable policies for rationing river use.

RESPONSES BY DEVELOPING COUNTRIES TO GLOBAL WARMING by T. Wilbanks, Oak Ridge National Laboratory, Oak Ridge, TN 37831.

Although actions by industrialized countries are the main cause of anthropogenic climate change, fossil energy use and deforestation in developing countries are likely to be the main sources of additional pressure on the global climate in the next century. As a result, the roles of developing countries in determining responses to global warming are a subject of growing intellectual and policy concern. The major themes of the discussion are: (1) potential conflicts between Third World economic/social development and global environmental protection; (2) effective policy tools for encouraging voluntary reductions in fossil energy use and deforestation in developing countries; (3) questions of equity, as (in a sense) the creators of the problem ask others to make sacrifices in order to help solve it; and (4) impacts of global warming on the developing countries, whose resources for adaptation are limited.

This paper summarizes the issues and the facts available to illuminate them, including recent projections of changing national and regional shares in greenhouse gas emissions. It concludes that: (1) the lead in reducing greenhouse gas emissions must be taken by the industrialized countries, through such politically hazardous steps as carbon emission taxes; (2) economic and social costs of developing country contributions should, as a rule, be subsidized by industrialized countries; (3) research attention is needed to provide better alternatives to current energy choices in many developing countries, especially China and India; and (4) research attention is also needed to prepare for impacts of global warming on developing countries, emphasizing changes in conditions for food production, changes in climatic extremes (e.g., storm tracks), and possible sea level rises.

THE GEOARCHAEOLOGICAL POTENTIAL OF THE LOWER LA CROSSE RIVER VALLEY by Dean G. Wilder, Department of Geography and Earth Science, and Robert F. Boszhardt, Mississippi Valley Archaeology Center, University of Wisconsin, La Crosse, Wisconsin 54601.

A review of existing data on the archaeology and geomorphology of the Lower La Crosse River Valley at La Crosse, Wisconsin was conducted to assess the geoarchaeological potential of the floodplain and adjacent marsh environments. The project was carried out as part of a broader development plan study of the La Crosse River Valley by state, county and city agencies. The purpose of combining archaeological and geomorphological research into a single study derives from the interactions that occur between a dynamic geomorphological landscape such as the La Crosse River Valley and human occupance of surfaces on that landscape.

The archaeological review reveals that the La Crosse River floodplain presents a void in the archaeological record that is surrounded by a nearly continuous record of prehistoric and early historic sites. The absence of site specific geomorphological studies for the Lower La Crosse River Valley required an interpretation of present-day geomorphology from aerial photograph and map resources, geomorphological history inferred from studies of nearby fluvial systems, and the construction of stratigraphic relationships from existing field boring logs.

The geomorphological analysis suggests that the lack of archaeological materials on the floodplain is the result of the burial of pre-1850 surfaces by increased flood sediment resulting from accelerated erosion following Euro-American settlement of the La Crosse River watershed.

LANDSCAPES AND SEDIMENTATION IN SHIELD DESERTS by M. J. Wilkinson, Lockheed Engineering & Sciences Company, 2400 NASA Rd. 1, Houston, TX 77058.

Although poorly described, the geomorphology of river end points in deserts is not only of intrinsic interest but provides what amount to alternative models of terrestrial sedimentation. Evidence is drawn from a selection of desert basins worldwide, based variously on field studies, Space Shuttle handheld photography and geoscience literature.

Basin size is greater in shield/platform geological settings than in basin/range settings. The former setting lacks the text-book basin/range sequence mountain -> alluvial fan -> playa. Through lack of mountain-front locations, alluvial fans are almost non-existent in wide areas of the African and Australian deserts. Even small rivers in shield/platform deserts commonly generate large "deltoid" landforms in their lower courses, as extensive as the largest humid-zone deltas. Deltoids are alluvial plains with apexes where rivers exit low, interfluve hill country. Sand-dominated deltoids give rise to the well-known braided rivers and sand dunes. Evidence exists for extensive areas of mass flows on some arid valley floors, as a result of flow loss by infiltration. Some Australian deltoids are silt-dominated: these display such classic "humid" features as levees, anastomosing stream patterns, few sand dunes, and swales which hold water for months after flooding. Stream profiles are markedly convex to the sky, locally and regionally. Flood basins ("floodouts") occur along the courses of major streams, filling and emptying during a single flood. The location of dry lakes is locally related to past river channels and interdunal hollows rather than to structural basins. Dry lakes in shield/platform deserts show lesser development of evaporite facies, since end-point lakes usually do not coincide with the locus of evaporation at the low point of the hydrological basin. The three-dimensional architecture of sediment bodies can be sheetlike under conditions of unchannelized flow.

CHANGE IN A LEISURE-DOMINATED COMMUNITY: COLLINGWOOD ONTARIO by Paul F. Wilkinson, Faculty of Environmental Studies, York University, 4700 Keele Street, Toronto,Ontario, Canada M3J 1P3

Many North American communities are undergoing massive economic, social, and structural change as a result of such factors as the demise of traditional industries, shifting socio-demographic patterns, and lifestyle changes, notably those related to recreation and tourism. As a result, there have been fluctuations in employment, business investment, demands for services, housing and land values, and the mix of traditional populations with new residents. The failure of legal and administrative structures, both locally and regionally, to deal adequately with large-scale and sudden changes frequently makes such situations more complicated.

This paper examines a particular case study, Collingwood, Ontario, a town of 12000 approximately 150 km north of Toronto. Traditionally, the town has been dependent on ship-building, agriculture, and light manufacturing, bolstered by a highly seasonal recreation and tourism industry based on skiing and summer second homes. Since the closing of the ship-building industry in 1984, it has become increasingly apparent that the town is becoming dominated by the "leisure industry" fuelled by the 5 million inhabitants of economically prosperous Southern Ontario within 250 km of the town: ski resort expansion, new golf courses and marinas, construction of over 1000 condominiums, plans for wäterfront revitalization, etc.

Following analysis of recent and projected trends in land values, construction, home ownership, retail/commercial mix, and employment, the paper discusses the legal and administrative barriers that have blocked effective understanding of the issues involved and suggests ways in which planning processes could be altered to deal more adequately with such a turbulent environment. Finally, the paper demonstrates how this case study can be linked to the situation in other areas facing similar problems.

TOURISM AND DEPENDENCY: MINORCA'S (SPAIN) INTERNATIONAL AIRPORT by Mark T. Williams, University of Kentucky, Lexington, Kentucky 40506.

A common challenge facing scholars applying dependency theory to analyze a place's economic sector is to obtain variables with which to measure the level of dependency a sector may experience. In the case of tourism, a fruitful way to measure dependency is by examining the numbers and national origins of tourists to a host nation's destination. Knowing the percentages of tourists from different national origins to a host nation's tourist destination makes it possible.for a host nation to know the direction and intensity of dependency its tourist sector is undergoing. Ideally, the national origin of tourists should be fairly diversified, thus preventing a host nation's tourist sector from becoming dependent on the economic success of one or two nations for its own success. This paper is concerned with how the establishment of an international airport capable of handling jet aircraft has influenced the direction and intensity of dependency experienced in the tourist sector of the Spanish Balearic Island of Minorca. The data obtained on national origins of Minorcan tourists from 1965 to 1988 show that the proportion of British tourists increased dramatically in this time period (from 25% to 78 %), especially after 1969, the year when the island's international airport was inaugurated.

MICROCLIMATIC TEMPERATURE RELATIONSHIPS OVER DIFFERENT SURFACES by Thomas B. Williams, Department of Geography, Western Illinois University, Macomb, Illinois 61455.

Microclimate refers to the small-scale climate near the surface. The nature of the underlying surface largely determines microclimatic conditions. The most important surface controls on microclimate include: 1) type of surface, whether natural (grass, trees, or soil) or artificial (concrete or blacktop/asphalt); 2) surface thermal properties such as heat conductivity, heat capacity, or albedo; 3) availability of surface moisture for evapotranspiration.

The purpose of this microclimatic study is to compare the effects of different surfaces on surface and air temperatures in an urban campus setting. Data were collected using an aspirating psychrometer and surface temperature probe at various times during the day. Surfaces sampled in the urban campus environment covered natural grass, bare ground (soil), a gravel parking lot, concrete sidewalk, and asphalt parking lot.

Results indicate that the warmest air temperatures occur over the artificial concrete and asphalt surfaces. Natural surfaces such as grass, dirt, and gravel experience temperatures around 2.0°F (1.1°C) cooler. Typically, maximum values for concrete and blacktop are found in mid-afternoon, the normal time of occurrence for the daytime high. Warming over gravel and soil is somewhat delayed, with the highest readings reached in late afternoon. Relationships for surface temperature conditions are similar in most respects. Variations between different surfaces are small. Maximum surface temperatures correspond to the peak in solar heating, but are again delayed for the gravel surface, and occur earlier over grass.

CORPORATE MODE OF PRODUCTION AND RACE IN BIRMINGHAM, ALABAMA, 1907-1960 by Bobby M. Wilson, University of Alabama at Birmingham, 35294.

The paper discusses the relationship between race and the corporate mode of production in Birmingham. As the industrial city of the South, industrialists early in the century relied upon and exploited a source of black labor that became available after slavery. The failure to distribute plantation lands among freed slaves added to the laboring class of the South and located at the southern end of the Appalachian Mountain Birmingham had access to the labor pool of the Black Belt. No other industrial city in the U.S. would rely as early on black labor in its development as Birmingham.

The corporate stage of accumulation in Birmingham was dominated by the U.S. Steel Corporation that covered the period 1907-1960. The populist movement of the South provided the impetus for this new mode of accumulation which used the racial issue to segment labor and dissolve the class unity that was forged under an earlier mode of production. Because of racial segmentation of labor, the economic class variable was found to be significant in housing patterns during this period.

CONTINGENT SLUM PERSISTENCE: AN APPLICATION OF THE POLITICAL ECONOMY OF PLACE THESIS by David Wilson, Indiana University, Indianapolis, Indiana 46202

This study adds more contingency to Logan and Molotch's political economy of place concept by casting neighborhood change as active and structured. Slum persistence in Indianapolis is shown to be individually driven and molded by rounds of investment building upon prior growth. Local actors negotiate culture and ideology that is itself tempered by the realities of uneven development. Neighborhood change becomes a process driven by a dialectic of interpreter and structure. Uneven development defines preconditions for action; interconnections between daily life, ideology, and individual meanings mediate these influences. Neighborhood change involves conflicting actors guided by bounded but context specific motivations.

KING ST. E.
228
SHERBOURNE ST.
63

THE ROLE OF A MULTINATIONAL ENTERPRISE IN DEVELOPMENT IN BRAZIL 1968-1978 by James R.Wilson,Miami University, Oxford, Ohio 45056

The basic hypothesis of this paper is that multinational enterprise can contribute positively to economic growth and geographic change in developing countries. The geography of enterprise approach to economic and industrial geography was introduced by McNee and followed by Keuning, Krumme, Bergman, Dickson, and Chapman. It focuses on the corporation in its geographic environment or its hypothetical company region. It questions the corporation from a human and social perspective under three broad headings: function, structure, and evolution. The emphasis is upon the role of human creative choice in economic growth.

The historical geography of the agribusiness firm herein explores some of these questions while testing the hypothesis.

The firm grew and spread throughout Brazil during its dynamic growth decade of the 1970s. Agriculture is the major sector of the Brazilian economy. Brazil's agriculture was transformed and modernized during this period.

THE SECTORAL STRUCTURE OF SOCIAL WELFARE SERVICES ACROSS METROPOLITAN AREAS by Mark Wilson, James Madison College, Michigan State University, East Lansing MI 48825-1205

Social welfare services at the metropolitan level are provided by the public and nonprofit sectors. These sources of service delivery are organizationally distinct yet often closely related. While the level of service provided varies across U.S. metropolitan areas, even greater is the spatial difference in the structure of social welfare activity. The mix of public and nonprofit service delivery ranges from strong reliance upon the nonprofit sector in northern and midwest metropolitan areas to a far greater public role in other areas. This pattern reflects the need for service today; support for nonprofit agencies as an extension of government; and past economic and political factors that influenced the development of the public and nonprofit sectors. The determinants of structural composition are tested empirically using data from the Censuses of Governments and Services for 1977 and 1982.

OLD-GROWTH FORESTS: PERCEPTIONS AND RESOURCE ALLOCATION by Mark Wilson, Oregon State University, Department of Geosciences, Corvallis, Oregon 97331

There is turmoil in the douglas-fir region of the Pacific Northwest because of conflict over the region's remaining old-growth forests. Several interest groups, including scientists, environmentalists, commodity producers, and state and local governments are trying to control the allocation of old-growth through pressure on various federal natural resource management agencies, the Congress, and the courts. A principal impediment to the allocation process is the lack of a definition of old-growth acceptable to the various interests. Conflicting perceptions of old-growth forests are critical to developing a definition and resolving a conflict that impacts the lives of thousands of people. Because no universally acceptable definition of old-growth has emerged, it is not known how many acres of old-growth exist. Other questions regarding old-growth such as minimum ecologically significant stand size and the appropriate distribution of remaining stands at the landscape level will be solved based on resource perceptions. To reserve stands in a preservation status or manage the remaining stands for commodity production yet retain old-growth characteristics is a conflict developing due to differing resource perceptions. This paper explores the development of old-growth perceptions by the various interest groups and how those resource perceptions result in behaviors affecting governmental institutions and the resource allocation process.

INTERNATIONAL TRANSPORT REGIMES AND CONTIGUOUS COUNTRIES: GOODS MOVEMENT BETWEEN THE UNITED STATES AND CANADA by Janos L. Wimpffen, KJS Associates, Bellevue WA 98004.

This study considers how the property of contiguity affects international transportation. It establishes a classification system whereby the propensity of political borders to influence the access, coordination and competition between transport regimes can be evaluated.

Contiguity implies that coordination between two transport regimes has to be maximized. However, contiguity also allows differences in the regimes to be accentuated.

The recent history of North American transborder transportation has demonstrated that contentious issues commonly occur within each mode. Some issues are specific to certain regions or locations while others are more continental in scope. The study develops a taxonomy for classifying the issues based on the collective objectives and conduct of shippers, carriers and policy-makers.

North American transborder transportation is continually in a process of readjustment. Regulatory changes in one or the other country leads to disequilibrium in the formal and informal ways of conducting transportation. The reaction of the interests on the other side is often greater than compensatory. A cycle of "leapfrogging" ensues where equilibrium in the interests of the two sides is never quite attained.

A number of empirical examples are summarized including cabotage, competitive line rates and port diversion. Market motivated determinants generally seek to maximize coordination without necessarily maximizing competition. Public policy determinants often focus on the control of access. Many of the issues first arise as problems of access and then later become problems of coordination. The study provides a useful investigation of how ideas about trade and about borders are shaped in the context of real world conditions.

COUNTERDEVELOPMENT STRATEGIES FOR BIOREGIONAL DEVELOPMENT: NATIVE AMERICAN COMMUNITIES IN TRANSITION by Dick G. Winchell, Eastern Washington University, Cheney, WA 99004.

Economic development theory has radically changed over the past two decades, while strategies for local development programs have often failed to reflect such changes. Local government strategies for economic development often assume a relatively autonomous local economy within a region, although recent studies demonstrate the domination of power and capital within regional economies by centralized, metropolitan influences. Strategies based upon a more accurate portrayal of uneven development within regions attempt to overcome such domination or create alternative frameworks for economic activities. These strategies are termed counterdevelopment, and incorporate bioregional frameworks to guide appropriate economic and community development. Native American reservation communities are used as case studies to demonstrate counterdevelopment strategies.

INDUSTRIALIZATION OF U.S. AND WEST GERMAN AGRICULTURE - A COMPARATIVE STUDY by H.-W. Windhorst, Dept. of Geography, Universitaet Osnabrueck-Standort Vechta, 2848 Vechta, West Germany

The paper will present results of a research project undertaken between 1985 and 1988 in the United States and Central Europe. It will be shown that the process of industrialization in agricultural production can be described in Germany as well as in the United States by: sectoral concentration, capitalization, decentralization of management and the forming of vertically-integrated agrobusiness companies, and finally, regional concentration.

The main steering factors for this process were: agricultural research and propagation of its results, agrotechnical innovations and their diffusion, agropolitical decisions and tax regulations. Concentration processes in food industry and retail have also had a great influence.

Industrialization of agriculture was and is accompanied by far-reaching socio-economical and geo-ecological impacts. These, however, have reached a more critical state in some parts of Germany than in the United States, as far as the ecological aspect is considered, whereas the socioeconomical impacts are more important in the United States.

THE LOCATION OF OBSTETRICIAN AND GYNECOLOGIST OFFICES IN MEMPHIS, TENNESSEE, 1950-1988 by Elizabeth Winegar, Department of Geography, Memphis State University, Memphis, Tennessee 38152.

Since 1950, rapid suburbanization has occurred in Memphis, Tennessee. As segments of the population moved away from the central city, many physicians chose to locate their offices in the suburbs away from the downtown medical center. This paper examines one specialty group of physicians, Obstetricians and Gynecologists, and describes the changes which have occurred in their practice locations since 1950. The accessibility of these offices to women of child-bearing age, the primary market of this specialty group, is examined as well as the proximity of the offices to hospitals providing obstetrical and gynecological services. Other factors which may affect the physicians' practice location choices are examined and include the income and education levels of the areas surrounding the offices and the proximity of these offices to establishments providing competitive services.

CHANGING PRECEDENTS IN MAP ACCURACY LIABILITY CASES,

by Everett A. Wingert, Department of Geography, University of Hawaii at Manoa, Honolulu, Hawaii 96822.

Tort liability actions brought on the basis of map inaccuracy have only relatively recently appeared in United States court reporters. Map copyright suits and cases charging survey error in large-scale plats have been relatively common since the late-1800s. But in recent years, suits blaming inaccurate smaller-scale maps for death and damages have begun to appear. Most of the earlier cases cited involve federal nautical and aeronautical charts. The precedents established by these actions were noteworthy for arguments used to determine whether the government can be held liable rather than for a detailed analysis of the specific inaccuracy. Federal cases are often decided by whether the inaccurate chart element arose out of discretionary planning or operational tasks, rather than if the chart was negligently made.

When liability case defendants are in the private sector, much more direct analyses of positional or design inaccuracy are involved in the cases. In the earlier cases of liability brought by specialist users, arguments were based on simple liability theory for negligent inaccuracy of charts and damages were awarded accordingly. In more recent cases, precedents based on "product defect" theory have been employed successfully. The presentation analyses the implications of this important shift in tort liability argument to cartographers making both conventional maps and some of the newer decision map forms designed for application by the non-specialist user.

PRINCIPAL COMPONENTS ANALYSIS OF SUBSYNOPTIC-SCALE CIRCULATION FIELDS PRECEDING HEAVY PRECIPITATION

by Julie A. Winkler, Michigan State University, East Lansing, Michigan 48824-1115.

Forecasting extreme rainstorms is complicated by the wide variety of subsynoptic-scale circulation patterns responsible for these events. In this study, principal components analysis is used to isolate the characteristic surface pressure, moisture, vector wind, and convergence patterns associated with summertime heavy precipitation. The analysis includes: 1) a comparison of the component patterns to previously identified composite fields, 2) identification of spatial and temporal variations in the component patterns, and 3) an analysis of the co-occurrence of the modes of variation for the different surface parameters. Also, heavy rain events are objectively classifed on the basis of their scores for the component patterns, and the "storm types" are interpreted in terms of preferred geographic location, time of occurrence, frequency, and precipitation amount.

DRAINAGE INNOVATION AND DIFFUSION ON THE ILLINOIS PRAIRIE

by Roger A. Winsor, Appalachian State University, Boone, North Carolina, 28608

Before settlement, east central Illinois was a tall grass prairie, interspersed with ponds and sloughs. The areas' first agricultural focus was on the production of cattle, using the sloughs as pasture, while farming the ridges. Following the arrival of the railroads in the 1850's, the area evolved into a region specializing of corn. The areas' extensive wetness, drowned crops, curtailed yields, and increased interest in draining the land.

Early drainage adopters fit the classic generalizations presented in the literature on innovation, they were wealthier, owned larger sized units, were opinion leaders, had more exposure to information channels, and more contact with change agents. While all innovators operated larger sized units, not all large landlords were innovators. Several early adopters introduced European drainage technologies.

Three indices of diffusion were examined: (1) the building of tile factories in Illinois, (2) the adoption of tile drainage in east central Illinois, and (3) a case study of the drainage of a 20,000 acre farm estate. The pattern of drainage adoption "radiated" outward from the innovation center, with counties at the farthest distances adopting last. The study suggests that diffusion resulted not from distance decay and the function of interaction over distance, but from other factors, particularly the need for dredging and the lack of tile factories. The idea diffused universally but it could only be adopted where certain prior arrangements or certain kinds of infrastructure were provided.

PALIMPSEST RELATIONSHIPS IN ADJACENT BUT DIFFERENT TERRAINS OF SOUTHERN MICHIGAN

by H. Winters, Michigan State University, East Lansing, Michigan 48824, and R. Rieck, Western Illinois University, Macomb, Illinois 61455.

In the Grand Rapids area a low relief plain, that evolved from glacial Lake Chicago, is adjacent to upland segments of the Late Wisconsinan Lake Border and Valparaiso moraines. Logs for each of 98 wells here report the presence and elevation of buried organic matter that represents elements of a paleosurface that existed about 34,000 years ago if four pertinent radiocarbon dates are correct. On the basis of differing topography the wells can be divided into two clusters (lake plain with 61 sites, morainal upland with 37) and the related data analyzed accordingly. Comparisons between 1) 1) bedrock surface configuration, 2) elevations for buried carbonaceous material, and 3) relief of toady's topography show very strong similarities of each to the otehr two within both clusters but marked differences with their counterpart in the other cluster. Alrogether these findings indicate that the present terrain associated with both clusters directly reflects local relief on a late Mid-Wisconsinan paleosurface which, in turn, reflects regional, but not local, variations on the more deeply buried bedrock surface. On this basis we conclude that multiple palimsest relationships of different degrees are involved in this area's geomorphic development and character.

PAYMENTS FOR ORIGINAL INDIAN TERRITORIES: A GEOGRAPHICAL INTERPRETATION OF INDIAN DISPOSSESSION.

David J. Wishart, Dept. of Geography, University of Nebraska, Lincoln, NE. 68588-0135

The purpose of this paper is to explain variations in payments for original Indian territories and, in doing so, to formulate a new geographical interpretation of Indian dispossession. The area covered is the United States west of the Appalachians, the time period stretches from 1795, when the first cessions were made in Ohio, to 1912 and the last cessions of original Indian lands in New Mexico. The first step in the analysis is the construction of three maps, the first showing how much, in dollars and/or cents, the Indians received for each cession of land held under original title, the second showing how much those lands were worth per acre at the time of taking, and the third showing the percentage discrepancy between these two values. The patterns on the map raise questions, questions which can only be answered within the "situational context" of each cession, or group of cessions. The research provides not only, for the first time, precise statistics on how much the Indians received for their lands but also explains why some Indians received no compensation while others were paid considerable amounts.

LIFE TECHNICS FOR SUSTAINABILITY AND JUSTICE

Ben Wisner, Hampshire College, Amherst, MA 01002

In a prior paper the complex and ambiguous relationship between sustainability and justice has been established. The present paper explores a range of methodologies with which activists and planners can resolve conflicts that arise when attempts are made to achieve justice and sustainability in equal measures. These methodologies include ways of focussing attention on time and space more flexibly than is presently the case. Historical geography can be rethought and utilized to help extend our normal planning horizon forward at least 150 years. Cultural ecology can likewise be reformulated so that communities and regions are revealed as the locus of sustainable and just livelihood systems. Neither set of methods is sufficient (though necessary) without full participation of all persons affected.

CLIMATIC CHANGE AND TROPICAL MOIST FORESTS, by Mark A. Withers, University of California, Los Angeles, Los Angeles, California 90024.

Popular media focus on tropical deforestation's role in global warming may be misdirected. More attention should be focused at the effects of global warming on the extent and nature of tropical moist forests. This paper summarizes selected literature on the reciprocal effects of global climate change and tropical forests.

Climate models project that past and future changes in atmospheric concentrations of CO_2 and other greenhouse gases will lead to an average global warming of 1.5-6°C. Complete tropical deforestation would likely increase atmospheric CO_2 concentration by 20% or less, which is far less than the increase expected due to fossil fuel and other anthropogenic emissions. Thus, based on emissions of CO_2 and other greenhouse gases, tropical deforestation does not appear to be the major cause of global warming. Deforestation significantly alters surface cover, potentially changing albedo and disrupting moisture budgets. Models project only minor global changes due to these effects, but substantial local and regional perturbations in temperature and precipitation regimes are likely.

Evidence of past ecosystem mobility correlated with climate change suggests that boundaries of tropical moist forest habitat will move in response to projected global warming. Current projections of ecosystem boundary changes are highly speculative, but such changes threaten the biological diversity of tropical moist forests. Massive clearing will leave small remnant patches of isolated forest, which would suffer boundary and edge effects, lack colonizer sources, be more vulnerable to fire and other disturbance, and be far removed from suitable habitat that has moved due to projected global warming.

URBAN SUMATRA, INDONESIA: TWENTY-FIVE YEARS OF DEVELOPMENT by W.A. Withington, University of Kentucky, Lexington, KY 40506.

Since 1961 a variety of changes have affected Sumatra, Indonesia's large western island region. The purpose of this discussion is to identify the most important changes for Sumatra, using its three principal urban areas of Medan, Palembang and Padang as exemplars of development.

Most change has been positive, enhancing Sumatra's importance as Indonesia's leading source of commercial agricultural products and of export-oriented minerals, notably petroleum, natural gas, tin, bauxite and coal. Sumatra is the second leading Indonesian source of manufactured and forestry products. In the three urban areas and their hinterlands the transportation infrastructure has greatly expanded as measured by numbers of motor vehicles, improved seaports with container services and enlarged airports handling newer, larger jet aircraft. Manufacturing, including processing of local produce and of cement, fertilizer and consumer goods, has greatly increased. The social infrastructure of government offices, schools, hospitals, modern markets and communications is more intensive and is supported by much enlarged, more dependable electric power generation.

Detrimental or negative changes in Sumatra's three urban nodes are far greater atmospheric pollution from vehicles, manufacturing and power plants, as well as declining utility and quality of some major urban or connector highways and of most railway facilities.

Most urban Sumatran Indonesians now enjoy a considerably improved economic level and quality of life by comparison with conditions in 1961.

ETHNO TERRITORIAL STRIFE IN THE CAUCASUS AND SOVIET TERRITORIAL POLICY BY R. Wixman, Geography Department, University of Oregon, Eugene, Oregon, 97403

In the past three years we have witnessed a great deal of ethnic unrest in the Caucasus region of the USSR. Armenians and Azerbaidjanis vie for control of Nagorno-Karabakh, and Abkhazians and Georgians argue over to which republic Abkhazia should belong. Numerous other, and equally sensitive, ethno-territorial disputes between the various nationalities of the region are coming to the forefront. The borders between the Georgian and Armenian, and the Georgian and Azerbaidjan republics are coming under dispute, as are the borders of the North Ossetian and Chechen-Ingush ASSRs.

I show in this paper that although many of these disputes of ethno-territorial borders predate the Soviet period (1917) many of these disputes were flamed by the Soviets as part of official policy in order to promote Soviet, i.e. Muscovite, control over the region. It is not only the actual borders, but also the language and religious policies as applied to specific territories and the differing statuses of these territories that are now being disputed. Maps will be used to illustrate these points.

Many of the Caucasian ethnic-territories were created as part of a policy aimed directly at and against the Soviet Union's southern neighbors, Turkey and Iran. The existance of many of the numerous autonomous regions and republics established by Lenin and Stalin results from a desire to influence related peoples residing in those countries. I will demonstrate that many of the contemporary problems of the USSR, in terms of ethnic strife, are the direct product of official territorial policies established during the first years of Soviet rule.

CHANGES IN AMERICAN POVERTY OVER TWO DECADES by Ernest H. Wohlenberg, Indiana University, Bloomington, Indiana 47405.

Revolutionary changes have swept over American economy and American society in recent decades ranging from the graying of America to the breakup of the traditional family and deindustrialization. The general question addressed in the paper is whether and how these broader changes in economy and society have been reflected in our ability to predict variations in poverty incidence over subareas of the United States. Models consisting of five different partial sets of variables as well as a comprehensive model which included all variables in the other five sets were fit to cross-sectional data from the three most recent U.S. censuses using stepwise multiple regression analysis. Some of the conclusions are: 1. the ability to account for geoggraphical variation in incidence of poverty decreased progressively from 1960 to 1980, 2. among the partial models the individual and family characteristics models gave better fits than the other partial models, and 3. the best models can account for between ninety and ninety-five percent of the variation in incidence of poverty.

HOMELESSNESS AND ECONOMIC RESTRUCTURING OF DOWNTOWN LOS ANGELES by Jennifer R. Wolch and Robin M. Law, University of Southern California, University Park, Los Angeles CA 90089-0042.

The rise in homelessness in US cities is partially an outcome of changes in industrial composition and labor requirements which have reduced the income-earning ability of workers at the lowest skill levels of the labor market. These workers are the most spatially constrained in their job search, and thus loss of low-skill jobs in one location within the metropolitan area is likely to have the most intense impact on the workers who live nearby, and can contribute to local patterns of housing crisis ranging from overcrowding to eviction.

Downtown Los Angeles provides a useful case study for exploring the effect of industrial change on employment at various skill categories, and the interaction of economic restructuring with population and housing trends in the surrounding communities of the inner city. Data on the industrial mix in 1976 and 1984 was combined with information on the skill requirements within each 2-digit industry to track the changing composition of skill levels downtown. Together with data from other sources, the research showed that downtown provided a significant site of low-skill employment, particularly for residents of the poorest tracts in the inner city, but that the industries with a high share of low-skill workers grew much more slowly than other industries.

Absolute job loss in some manufacturing industries, decline in the relative share of low-skill jobs, and declining real wages among the low-skill segment downtown all contributed to the worsening situation of downtown low-skill workers. These were combined with (a) demand for local housing from the growing high-skill/high-wage workforce downtown; (b) pressure from industrial and commercial activities on sites of low-cost housing in and around downtown; (c) housing demolition to meet seismic standards; and (d) massive inflows of poor immigrants from Asia and Central America to the inner city. The outcome was increased competition for housing leading to rising rentals, overcrowding, illegal construction of substandard backyard shelters, displacement of fixed-income households from their homes, and a growth in the number of working poor on the streets.

MODELS OF TREE GROWTH FROM BIOLOGY AND GEOMORPHOLOGY BY M.Woldenberg, Geography, SUNY at Buffalo; R. Pentney & M. Quackenbush, Anatomy, SUNY at Buffalo; and M. O'Neill, Geography, Virginia Poly. Inst. & State U.

The development of a large river network is a long and complex process, unobservable in a lifetime. Growth of brain cells, blood vessels and lungs takes place hidden from view. Can we determine a development process by examining tree geometry at one or more times?

Present topology alone can suggest a range of acceptable probabilistic growth models (Van Pelt et al. 1989; Horsfield, Woldenberg & Bowes 1987). Changes in mean lengths of various link types are causally related to changes in magnitude in rivers (Abrahams 1976) and Purkinje cells from rat brains (Pentney et al. 1989). Rat brain cell data also show that a Fibonacci pattern of mean link lengths is consistent with mainly terminal sequential branching ("headward erosion").

The Weber model has been used to determine the angles of junctions of arteries (Murray 1927; Zamir 1976), rivers and airways (Roy 1981) and to calculate the cost of individual junctions of arteries (Woldenberg & Horsfield 1983). The globally optimal geometry of a tree, given a cost function, has been derived by Howard (1988) and Lea (1988). Local or global optimality places geometrical constraints on the growth of rivers (Playfair 1802; Howard 1989) and other trees.

Studies by geographers and anatomists have shown that drainage density and optimality determine link lengths and topology. We should continue to share ideas across the zone separating the macrocosm and microcosm.

ENVIRONMENTAL IMPACT STUDIES AND HUMAN VALUES: THE CASE OF TWO FORKS DAM by Christopher J. Woltemade, University of Wisconsin-Madison, Science Hall, Madison, WI 53706.

Conflicts over dam construction proposals are often both technical (How would the dam affect the natural environment?) and value-based (How would the dam affect human values and interests?). Similarly, environmental impact statements (EISs) are required to examine impacts in terms of both the biophysical system and associated human values.

This paper examines the degree to which human values and interests are considered in EISs. Four models representing the analysis of alternatives in EISs are developed and compared: (1) the minimum requirements of the National Environmental Policy Act of 1969, (2) the Corps of Engineers' procedures to prepare EISs under the Clean Water Act, (3) the current environmental impact assessment theory, and (4) the Two Forks Dam EIS.

This research indicates that EISs may stress technical analysis of specific environmental impacts, such as the biomass of trout which would be lost through dam construction. Such technical analyses often conclude that specific impacts can be mitigated to the degree that they are insignificant and, therefore, construction permits should be issued. A value-based analysis of impacts might conclude that impacts on human interests and values cannot be fully mitigated and, therefore, valued landscapes should be preserved through denying construction permits.

GRAPHIC ABSTRACTIONS IN TRADITIONAL CHINESE MAP DESIGN by David Woo, Dept. of Geography, University of California, Santa Barbara, CA 93106.

While western cartographers make maps to measure and portray the physical reality, ancient Chinese make maps to express and convey the subjective interpretation of Nature. This paper takes an Oriental perspective to look at the humanistic approach of map design. It examines the "expressiveness" of classical Chinese maps as pictorial forms symbolic of human feelings. The eastern concept of pictorial space and graphic abstraction is discussed. The influence of Chinese ethnocentrism on map orientation is studied. The treatment of map information hierarchies in the overall map design is analyzed. In conclusion, graphic abstractions in traditional Chinese map design are expressions of Chinese cultural topophilia. The strategy of early Chinese cartographers used in map communication is to create a graphic language of map symbolism that harmonizes with the Knowledge structure and social norms of the general map readers.

CLIMATE CHANGE, SNOW, ICE AND FREEZE RELATED VARIABLES, by M-k Woo, Department of Geography, McMaster University, Hamilton, Ontario, CANADA L8S 4K1 and P. R. Waylen, Department of Geography, University of Florida, Gainesville, Florida, 32611.

Ice and snow constitute by far the largest global, land-based store of water in the hydrologic cycle, thereby effecting the temporal redistribution of liquid water occurrence on a large proportion of the Earth's surface. Current mean monthly temperatures and precipitation (rain and snow) are presented at three Canadian locations in the High and Low Arctic and on the Prairies. These are incorporated into a simulation model of daily temperature and precipitation. The effects of climate change under conditions of global CO_2 doubling, as predicted by four general circulation models and entered into the simulation model. Potential changes in snowfall, date of freeze-up and melt are discussed at each of the three locations.

FACTORS INFLUENCING ACCIDENTAL RELEASES OF TOXIC CHEMICALS IN THE U.S. by Antony P. Wood, Chi-Ho Sham, Department of Geography, Boston University, Boston, MA 02215, and Samuel J. Ratick, CENTED, Clark University, Worcester, MA 01610.

One key question relating to the accidental release of toxic chemicals is how to explain the difference in the severity of event outcomes. Using the Acute Hazardous Events Data Base (AHE/DB), this paper analyzes the spatial pattern of accidental releases of toxic chemicals in the U.S.. The AHE/DB codifies the event characteristics of more than 10,000 accidental releases of toxic chemicals, primarily for the period 1980 to 1986. The AHE/DB was developed as part of the U.S. Environmental Protection Agency's response to the toxic chemical release in Bhopal, India in 1984.

Releases of toxic chemicals are categorized as being severe or non-severe events. Severe events are those events that involve deaths, injuries or evacuations, whereas non-severe events are those events for which no deaths, injuries or evacuations occurred. The characteristics and spatial patterns of severe and non-severe events are examined. The factors that influence the severity of an accidental release of toxic chemicals are identified.

MAPPING THE DEVELOPMENT AGENCIES: NORTH THAILAND EXPERIENCES by Colin Wood and Gerald Walter, University of Victoria, Box 1700, Victoria, B.C., V8W 2Y2, and Bhansoon Ladavalya, Chiang Mai University, P.O. Box 100, Chiang Mai 50002, Thailand.

The meaning and direction of development in less developed countries is experiencing substantial reappraisal and modification due to criticisms of ineffectiveness in policies in the face of an ever widening flood of problems. Consequently, the role of development agencies has come under increasing scrutiny. In response, activities are focussing more on small scale, grass roots projects and technology (small is beautiful) and a realignment of agency operations towards community management and interagency networking (congruence) (Korten 1980, 1984; Gorman 1984; Gohert 1987). The paper deals with the latter issue, specifically, the problem of determining the actual functioning structures of development organizations in Northern Thailand and their corresponding geographic domains of activity as a prelude to enhancing networking. Using published information and interviews the patterns of activity were established and synthesized and a networking system formulated. Preliminary results suggest that further trials with the system are necessary.

GENDER DISTINCTIONS IN STUDENT ATTITUDES TO EXPECTED URBAN CHANGE by Susan Wood, Department of Geography and Regional Planning, Indiana University of Pennsylvania, Indiana, PA 15705

Urban researchers have little examined individual lifestyle adjustments necessary in a future where change is certain. This study examines the attitudes of introductory college geography students to projected rigid air pollution control standards. Preliminary results indicate some gender distinctions in the scope of individual adjustments to the changed urban environment and in the spatial constraints involved.

TROPICAL DEFORESTATION: REGIONAL DEVELOPMENT OR GLOBAL THREAT? by William B. Wood, Office of The Geographer, U.S. Department of State, Washington, DC 20520-6510.

Growing worldwide concern over deterioration in air quality and global warming trends has sparked renewed public interest in the loss of tropical forests. The escalation of debate over environmental problems, such as deforestation, from local to international levels is challenging existing government institutions and legal systems. The task of forging agreements on curbing tropical deforestation, however, is complicated by changing political contexts as the problem moves from the local to the global levels. This paper puts the issue of tropical deforestation within an ecopolitical framework involving a hierarchy of political jurisdictions and the interaction of a broad range of actors who attempt to influence environmental policies.

GAIA: THEORY, PROPONENTS, AND RECEPTION BY THE SCIENTIFIC COMMUNITY by D. Woodcock, Dept. of Geosciences, Univ. of Missouri-Kansas City, Kansas City, Mo 64110

The Gaia hypothesis, introduced by James Lovelock and Lynn Margulis in the 1970s, states that the biota maintain the earth in a state favorable for life. Lovelock's involvement with Gaia dates to his work on the NASA Mars probe; his demonstration that chemical disequilibrium of the atmosphere is related to the presence of life on Earth remains one of the strongest evidences of Gaian control mechanisms. Margulis is a microbiologist known for her theory that eukaryotic cells evolved through symbiotic relationships among organisms. The Gaia hypothesis can be seen as an extension of her theoretical ideas to a larger spatial scale. Reactions to Gaia have differed by discipline. Biologists have either ignored Gaia or raised objections, and some environmentalists in particular have been strongly critical. Atmospheric scientists have generally been the most open to Gaian ideas, perhaps because of their need to understand the role of the biota in the global climate system. A public forum on Gaia held in 1988 led to formulation of a second version of the hypothesis (known as weak Gaia) in which the purposeful nature of Gaian regulation is downplayed in favor of an array of homeostatic feedback loops. Scientists studying cycling of substances on global scales or surface-atmosphere interactions are now likely to cite, or at least consider, Gaian-type explanations for the phenomena they study.

TREE-RING EVIDENCE FOR SUBMERGENCE OF THE SOUTHWESTERN WASHINGTON COAST 300 YEARS B.P. by D.K. Yamaguchi, C.A. Woodhouse, and M.S. Reid, Mountain Research Station and Institute of Arctic & Alpine Research (INSTAAR), University of Colorado, Boulder, CO 80309.

A great (Mw 8+) Cascadia subduction zone earthquake is thought to have caused coastal subsidence along the southwestern Washington coast about 300 years ago. Soil burial and tree deaths are hypothesized to have accompanied this event.

Remnants of western redcedar (Thuja plicata) have been found rooted in the uppermost of several buried soils in estuaries along the southwestern Washington coast. In this study, we have used dendrochronological techniques to estimate the dates of death of these snags. Tree remnants from 6 sites along 93 km of coastline were sampled and crossdated with nearby long-lived modern redcedar.

Dates obtained from crossdating indicate a general synchroneity of tree death among sites. The dates are estimates because sampled snags are missing a small amount of outer wood due to weathering. The outer rings of these dated snags show no decline in tree vigor, suggesting that trees died suddenly rather than gradually. These results provide evidence for synchronous, rapid submergence of the southwestern Washington coast about 300 years ago. This suggests that the subsidence was a result of a great subduction earthquake.

ESTIMATING UNKNOWN IMMIGRATION FLOWS WITH CURRENT POPULATION SURVEYS by K. Woodrow, U.S. Bureau of the Census, Washington, D.C. 20233.

As there are no official records on undocumented immigration and emigration, Census Bureau research has focused on measuring these flows during the 1980s. Accurate estimates are necessary to calculate an independent population estimate as of Census Day, 1990, to evaluate the completeness of the census.

Immigrant population statistics are available from the 1980 census and Current Population Survey (CPS) supplements conducted in November 1979, April 1983, June 1986, and June 1988. Focusing on recent research to measure the undocumented population as of June 1988, the residual methodology is outlined. For the 1980s, comparison of estimates of the undocumented population at various dates suggests that undocumented immigration contributed an average of 200,000 annually to U.S. population growth.

Related innovative work at the Census Bureau measures the emigrant population with a multiplicity sampling survey approach. The July 1987 and June 1988 CPS's included special supplements to estimate emigrants and Americans living overseas temporarily. This analysis suggests that about 160,000 persons emigrate annually.

This work is the only empirically based research on these phenomena. There are measurement issues that relate to population universe, population coverage, and statistical sampling. Application of the residual methodology varies between census and survey data as well as with availability of independent data sources on legal residents. The 1990 census will provide data for further measurement of the undocumented population and assessing the extent of emigration during the 1980s.

EXPERIMENT ON BEDLOAD TRANSPORT IN ASYMMETRIC OSCILLATORY FLOWS by J.M.Woodruff, University of Hull, and J.Hardisty, University of Hull, Hull, HU6 7RX, England.

During shoaling, waves develop pronounced asymmetry in both their form and in the currents generated at the bed. The current asymmetry is characterised by a stronger, but shorter duration onshore flow preceeding a weaker but longer duration offshore flow. The asymmetry of the flow and the slope of the beach, through the action of gravity, interact to control the direction of net sediment transport.

The present study measures sediment transport using a bed which is oscillated within stillwater. Many such studies have been carried out, however few combine the ability to oscillate the bed asymmetrically and change the slope at which the bed is oscillating. 320 experiments are reported in which the stronger onshore flow is driven both up and downslope, over a 0°-4° slope range.

Real time current metering was not necessary as the velocities could be accurately predicted by, $u(t) = a_1 \sin(\omega t) + a_2 \sin(2\omega t + p)$ where $u(t)$ is the instantaneous nearbed flow speed, a_1 and a_2 are the amplitudes of the two components, ω is the angular velocity and p is a phase shift.

Models for the effect of bedslope on threshold conditions are confirmed by the experiments. The results also allow a formula to be developed for the semi-cycle sediment transport rate on a sloping surface beneath asymmetrically oscillating flows.

SOIL EROSION AND STABILIZATION: IMPLICATIONS FOR PREHISTORIC SETTLEMENT-SUBSISTENCE RELATIONSHIPS IN THE PUEBLA-TLAXCALA BASIN OF MEXICO by William I. Woods, Department of Geography and Earth Science, Southern Illinois University at Edwardsville, Edwardsville, Illinois 62026.

Investigations consisting of aerial photographic analysis, ground reconnaissance, and a series of excavations have identified a sequence of prehistoric settlement-subsistence relationships in the Puebla Valley of the Central Mexican Highlands. An extensive water control system dating to the Formative Period has been defined at the Amalucan site. Similar systems extending into the Classic Period and associated with other large sites in the valley are projected. Postclassic occupations in the area appear to be quite limited, although contemporary settlements in the Puebla-Tlaxcala Basin to the west, most notably at Cholula, exhibit large population concentrations.

It is concluded that this pattern can be attributed to a shift toward drained-field agriculture, in part brought about by deforestation and its attendant erosion, coupled with pan-regional societal disruptions. Stratigraphic data, including a distinctive paleosol, are presented in the analysis of this projection.

RESPONSES TO THE REDEVELOPMENT OF AN EAST LONDON DISRTICT: ARGUMENTS OVER THE FUNCTION AND PURPOSE OF THE INNER CITY BY RESIDENT COMMUNITIES. Rachel Woodward, Geography Department, Queen Mary College, Mile End Road, London E1 4NS, UK.

This paper is concerned with an examination of conflicting ideas on the function of inner city areas, as propounded by their residents. The expansion of London's financial centre - the City of London - has resulted in redevelopment pressures on adjacent districts. In one such district, Spitalfields, part of London's East End, up to 20% of the total land area will have been cleared and rebuilt by 1995. Such redevelopment involves wholescale changes in use of the sites concerned and includes the 'invasion' of this district by offices and associated support functions for the financial and service sectors. Communities resident in the area have been involved with these redevelopment schemes, and their opinions of them range from outright opposition to support. Engaging in public debate over the future of the district, these communities have articulated views on their needs and their perceptions of the function and future of the district. These translate into differing responses to the regeneration of the area, and in particular in different levels of, and styles of participation within, negotiations between developers and communities. This paper is an examination of these responses to redevelopment, particularly by members of the younger politically left-wing white and younger second generation Bengali communities. It also assesses attempts amongst sections of these communities to dominate the public debate, by appealing to majority support for specific views.

ESTIMATING DAKOTA, NAKOTA AND LAKOTA POPULATIONS, 1642-1862 by Nancy L. Woolworth, University of Minnesota, Minneapolis, MN 55455

Population estimates have been recorded by Euro-Americans for the Siouan speaking people, including the Dakota, Nakota and Lakota, for the years 1640-1860, and population trends were tested in regression analyses. Beginning with population doubling following contact with the French Imperial fur trade, the populations began to vacillate after 1760, between periods of declines and periods of recovery, until the introduction of immunization and new food resources resulted in a sustained increase of their populations. This is a regional study for two hundred years of historical demography and epidemiological histories in the prairie/forest ecotone of the Upper Midwest and in the tall grass prairie areas to the west, resulting in continued population growth of this major geographical anomaly.

TRADE RELATIONS AND MATERIAL CULTURE IN SPANISH COLONIAL NEW MEXICO by M. A. Works, Geography, Portland State University, Portland, OR 97207.

The supply caravans plying the desert trails from Mexico City, through the silver mining towns of northern Mexico, to the frontier colony of New Mexico brought silks, chintz and porcelain from the Far East, linen from Europe, and finely executed crafts--carved chests, textiles and pottery--from Mexico proper. Although colonial (1598-1821) New Mexico is commonly regarded as isolated and impoverished, it in fact was connected through an intricate web of trade relations to the rest of the world. Items and techniques of workmanship came to Mexico from the far reaches of Spain's empire where they were redistributed to the outlying provinces. Phillipine carved chests, Majolica pottery, Oriental rugs and religious icons inspired cottage and guild industries throughout the New World. In New Mexico colonial material culture--imported and domestic--reflects this myriad of influence. Archival sources from the colonial era (decrees, supply lists, wills and inventories) indicate the relative richness of New Mexico's material culture and the impact of trade in the development of a distinctive regional culture.

CHANGES TO THE ONTARIO GEOGRAPHY CURRICULUM, by Ian A. Wright, Etobicoke Board of Education and the Ontario Association of Geographic and Environmental Education.

The geography program for students from grade seven to OAC has been changed significantly. The new courses direct changes in content and changes in teaching strategies. The major changes, however, are in the area of skills development. In the new guideline the teaching of geographic, cognitive and affective skills is mandated.

To implement this new geography program teachers must go through an extensive change process. Boards of education have established a variety of strategies to deal with the needs of the classroom teacher as they go through these changes.

POSITIONAL PRIORITIZATION AND OTHER COMPONENTS IN POINT-FEATURE NAME PLACEMENT ON MAPS by Chyan Victor Wu, Department of Geography, SUNY at Buffalo, Amherst, NY 14260.

This research investigates the variation of components in point-feature name placement on three road maps, in an attempt to infer guidelines for automated name placement. A previous study by the author has pointed out that the positional prioritization on road maps is a matter of publisher's preference than a universal standard. However, three other graphic components may also be crucial in determining the pattern of name placement. They are fontsize, distance between the name label and the symbol point, and local density around the feature. Special attention will be given on the arrangements between each component and the position in which the label was placed.

There may be principles or at least certain kinds of thoughts among map compilers when they perform the task of name placement manually. This research is designed to find out these implicit thoughts behind the display of name placement by examining name placement patterns. Statistical significance and qualitative description will both be employed to formalize valid and useful principles. This study will contribute to the literature on developing rule-based cartographical expert systems for name placement.

SIMULATION OF ENERGY BUDGETS ON DIFFERENT URBAN LAND USES by Lin Wu Climatology Department of Geography, UCLA, Los Angeles, CA90024

Since the city area expends so rapidly in resent years, the study of urban climates become more and more significant. The purpose of the research is to study the effects of different urban land uses on energy balance and urban thermal environment via numerical modeling approaches. Energy budgets and temperature variations over various urban land use categories, such as residential, commercial, institutional, and recreational land uses in Los Angeles had been simulated by a land use based urban energy budget model. The results indicated that the variation in energy budget and temperature over different land uses resulted from different geometry of the building structures in different land uses and the thermal properties of different building materials used. Those thermal properties included albedo, emissivity, conductivity and evaporative conditions of the surface. The results showed that both albedo and evaporative conditions of the surface had significant influence on energy budgets and temperature. The influence of conductivity was not significant. The results also indicated that the range of variation in energy budgets and temperature depended on different seasonal and weather conditions.

RAILWAYS AND THE SETTLEMENT OF CANADA IN THE POST-WORLD WAR I ERA by Susan Wurtele, Department of Geography, Queen's University, Kingston, Ontario K7L 3N6.

Railway involvement in the settlement of Canada is most commonly associated with late nineteenth century immigration policy under Sir Clifford Sifton. A less frequently studied aspect of this involvement focuses on the post World War I period. Considering that land was still being homesteaded in Alberta in the 1940's and 50's it would seem that this period deserves more attention.

From 1919 until the early 1960's, the Canadian National Railway operated a Department of Colonization and Agriculture. The functions of this department ranged from the solicitation of prospective immigrants in Europe and the United States to their settlement in Canada. In addition, considerable effort was expended in offering follow-up support to these settlers to ensure their success.

Based on archival research, this paper examines the activities of the Department of Colonization and Agriculture and presents findings on the nature of Canadian National Railway settlement strategy. The factors influencing this strategy included not only the policies of the contemporary government but also the public opinion of the time concerning the suitability of various ethnic groups for settlement in Canada.

The immigration and colonization work of the Canadian National Railways was instrumental in contributing to the in-filling of many of the more sparsely settled areas of Canada, especially in the northern prairies and certain areas of northern Ontario and Quebec.

SPATIAL DISPARITIES IN URBAN SOCIO-ECONOMIC DEVELOPMENT IN CHINA Yichin Xie, Anhui University, Anhui, China.

This study uses the relatively untouched, recent statistical material of 1986-88. Thirteen socio-economic indices for 353 cities are the basis on which a factor analysis has been run. The first factor, the elite factor, is almost evenly distributed throughout China. The high scores of the second factor, the investment priority factor, are concentrated in the eastern coastal belt. The third factor, the established industrial development factor, is scattered all over the country. Though the regional-balance policy has helped the dispersal of central places in the interior of the country, the post-1978 development policy of encouraging the better situated east coast region has accentuated economic development there.

EXTRAPOLATION OF MEAN MONTHLY CLIMATE DATA IN MOUNTAINOUS TERRAIN OF WESTERN NORTH AMERICA. by Jingli Yang, Geography Department, University of Maryland, College Park, MD 20742.

The climatic conditions of the Earth's land areas are determined by the general circulation of the atmosphere which functions to redistribute the radiation balance through energy and mass flow across the Earth's surface. Given that 30% of the land areas of the Earth are more than 1000 meters above sea level elevation, the topography introduces major distortions in the distribution and movement of energy and mass flow across the planet that, in turn, affect the global patterns of climate. Since climate data in mountainous terrain are available only in limited valley stations, models need to be developed to extrapolate valley climate data to any mountain site for global ecological modeling.

This research investigates the influence of continental scale patterns of topography on climate conditions for mountainous terrain of western North America. Based on the knowledge of topographic influences on atmospheric energy and mass flow as air passes over regions of variable elevations, a topoclimate model is developed for extrapolating mean monthly climate data, such as temperature, humidity, and precipitation in the western mountains of North America. Topographic data, including modal elevation, slope, and aspect for the study area, have a spatial resolution of 10 minutes by 10 minutes.

SOCIAL THEORIZING OF COMMUNITY EMPOWERMENT by Lakshman S. Yapa, Department of Geography, Pennsylvania State University, University Park, PA. 16802

In many parts of the developing world there is increasing evidence of common people coming together to carry out economic activities through their own informal organizations, and empowering themselves to better resist encroachment from outside agents. Examples of such social movements come to us from South America (Amazon rubber tappers), Africa (Naam movement in West Africa), and Asia (Chipko movement in Northern India). The three existing paradigms of development, neo-classical economic, radical political economy, and ecologically sustainable development, do not offer adequate methodologies to analyze and understand these new social movements of community empowerment.

The paper argues that a methodology called ecopolitical economy offers a more useful framework for theorizing about community empowerment. Ecopolitical economy proposes to bring together, the analysis of production forces (things), social relations of production (people), ecological relations of production (nature), and their mutual interconnections.

An ecopolitical economy approach to community empowerment will help us to investigate some of the following concerns: (1) the structural limits to community power, (2) the role of agency in social change, (3) the role of nature in the production of essential use values, (4) the role of production in the development of community-based political power, (5) the role of indigenous knowledge of nature and technology in production, and (6) the implications of using categories of modern social science in describing the goals, aspirations, and actions of these social movements.

MUTUAL AID AND COMMUNITY BUILDING: MONTREAL'S WOMEN'S HOUSING COOPERATIVES. by Gisèle Yasmeen, Department of Geography, McGill University, Montreal, Quebec Canada H3A 2K6.

This study deals with non-profit continuing occupancy housing cooperatives in the Montreal metropolitan area that have a mandate concerning women. The specific goal of the study is to explore the notion of "community" by focussing on mutual aid networks within the cooperatives. The study will concretely define community in general and mutual aid in particular as the exchange of goods, services and emotional support between housing cooperative members.

Members of five women-oriented housing cooperatives in the Montreal area were interviewed in order to elucidate the social linkages that exist within these living environments. Neighboring and friendship patterns are described, schematised and analysed using the latest contributions to social network research, literature on social relations, and urban social geographic theory. Finally, reflections are made on the spatial significance of such institutions and related social environments. Innovative design features in newly built projects and new uses of traditional architectural space in renovated projects are the principal spatial consequences of women's housing cooperatives.

THE DISTRIBUTION OF JUNCO RACES IN RELATION TO THEIR DOMINANCE by Peter Yaukey, Department of Geography, University of Georgia, Athens, GA, 30602.

I observed multi-racial flocks of dark-eyed juncos (*Junco hyemalis*) on their wintering grounds in Colorado and South Dakota to investigate how racial dominance levels might influence and be influenced by the distributions of these birds. Races were not equally dominant in agonistic interactions. The percentage of inter-racial interactions won by each race was calculated for each pair of races at each of nine sites. The dominance level of some races varied from site to site when their interactions with certain other races were compared among sites. Comparison with the results of Monte-Carlo simulations suggested that random site selection by juncos could not have produced as much variation in racial dominance levels among sites as was observed in some cases. Neither could these patterns of variation be explained by Gauthreaux's model, in which dominant animals force subordinates from preferred sites. Additional Monte-Carlo simulations were performed to compare the dominance level of a race that is distributed into many sites with small populations, and in fewer sites with larger populations. As animals occupied more sites, their dominance level varied more among sites. Variance in dominance among sites was greatest when the competing races were most equally dominant across the entire region. Increased variance of the dominance level of a race among sites could influence its region-wide rate of survivorship in certain situations.

SOCIAL AREAS OF GUANGZHOU by Anthony Gar-On Yeh, Centre of Urban Studies and Urban Planning, University of Hong Kong, Hong Kong, and Xueqiang Xu and Huaying Hu, Department of Geography, Zhongzhan University, Guangzhou, China

Principal component analysis and cluster analysis were used to examine the social areas of Guangzhou in 1984, using 67 socio-economic and housing variables. Population density, education, workers and cadres, housing quality, and household compositon were found to be the main components of social space of Guangzhou. The spatial pattern of social areas is in concentric elliptic form. A high density - mixed functions center is surrounded by consecutive rings of workers and agricultural areas, with a cadres sector abutting the northeastern edge of the city centre and two intellectuals clusters within the workers area.

Residential mobility is the main process in segregating Western cities into social areas. But, it is insignificant in Guangzhou because of the shortage of housing and a housing allocation system based on the provision of housing by production/working units. Social areas of Guangzhou is mainly the result of the interaction of the history of urban development, housing allocation system, and urban land use planning.

THE ROLE OF CHINESE COASTAL CITIES UNDER OPEN DOOR POLICY by Yue-man Yeung, Department of Geography, The Chinese University of Hong Kong, Shatin, New Territories, Hong Kong.

China's coastal cities, whose growth and development have been closely intertwined with the country's recent history, have been cast in the role of accelerating economic development with 14 of them being designated "open" cities in 1984.

This paper will examine the changing functions of Chinese coastal cities by focusing on their recent pattern of development in the framework of macro-spatial implications and from the standpoints of regional development and urban studies. The preponderant concentration of economic and industrial production capacity in the coastal regions is further enhanced. Chinese coastal cities are test cases of how under a prevailing socialist system, economic development can be speeded up with capitalist investments from the outside. As expressions of tangible conflicts under the socialist and capitalist systems, Chinese coastal cities are yet to evolve their brand of policies to come to terms with problems that have become critical in housing, transport, energy and other infrastructure services. What government policies have been adopted to enable coastal cities to pursue their new economic and catalytic roles? An analysis of the progress to date will be made against the problems that have been encountered through published materials.

The paper will draw on specific development experience in selected coastal cities to provide an idea of diversity of approaches within the overall objectives of openness and accelerated development.

U.S. ECONOMIC VULNERABILITY TO GREENHOUSE INDUCED SEA LEVEL RISE by Gary H. Yohe, Department of Economics, Wesleyan University, Middletown, CT. 06457.

Increased atmospheric concentrations of radiatively active gases (e.g., carbon dioxide, various CFC's, methane, nitrous oxides, etc.) are expected to cause global temperature to rise, on average, 2°C to 5°C over the next century. The effects of this "greenhouse" warming are likely to be widespread, but our current understanding of their likely dimension and their ultimate social, economic and political impacts is fraught with uncertainty. The best current estimates for greenhouse induced sea level rise through the year 2100 (caused in that time frame mostly by thermal expansion of the oceans) range, for example, between 50cm and 150cm (U.S. EPA Report to Congress, 1989). Some experts, though, record estimates as low as 10cm; others quote numbers as high as 2 meters.

This paper reports upon 25 site specific estimates of economic vulnerability to the full range of possible sea level scenarios. Each site differs in geography, rate of natural subsidence over which greenhouse sea level rise is imposed, and economic development. Economic vulnerability is reflected in the current value of threatened land and structure; it is argued that vulnerability represents an upper bound for the current value of potential economic cost, at least absent further development. Estimates of wetland loss, with and without protecting existing developed areas, are also recorded for each site. Since the sites are part of a systematic sample of the U.S. coastline, regional and national estimates of both vulnerability and potential wetland loss are also ventured; both are surrounded by subjective confidence intervals derived not only from sampling error, but also from the uncertainty with which we view the future.

THE ROLES OF FOREST DISTURBANCES AT A TROPICAL TIMBERLINE by Kenneth R. Young, Department of Geography, University of Colorado, Boulder, CO 80309.

From an aerial perspective, the upper limit of tropical montane rain forest in north-central Peru appears complex, with continuous forest ending in valley bottoms at 3200 m elevation and on valley sides at 3350 m, but with isolated forest patches present up to 3700 m on valley sides. On closer examination this complexity increases, with >70 species of trees and shrubs growing along the elevational gradient. I wondered what were the roles and effects of forest disturbances in causing and maintaining these landscape patterns in forest distribution and composition.

Forest structure and composition were examined in plots along a series of transects that crossed the elevational range of timberline forest or that extended from forest margins into forest interiors. Size-class distributions and spatial patterns of the plants were used to assess regeneration requirements.

There were profound changes in the presence and abundance of the arboreal species along with changes in elevation. Within the forest, tree and branch falls opened the canopy and allowed the regeneration of some of the species by vegetative and sexual reproduction, with the latter predominating at lower elevations. In the whole study area, human-set fires out in the grasslands acted to maintain forest margins, and occasionally destroyed forest. The resulting forest edges provided an enlarged habitat to light-demanding plant species, in addition to defining and creating forest fragments on valley sides and inverted timberlines on valley bottoms.

CHANGING FOOD ENTITLEMENTS: A COMPARATIVE ANALYSIS OF IRELAND AND SCOTLAND 1815-1845. The impact of capitalism on population and food entitlement relations in Ireland and Scotland 1815-1845 by L. Young, Department of Geography Vassar College, Poughkeepsie, N.Y. 12601.

This paper explores the divergent outcome of potato blight in Ireland and Scotland between 1845-1849 by examining conditions in Donegal, Ireland and Argyll, Scotland. Blight appeared in the fields of Donegal and Argyll in the years 1845-1849 and was the proximate cause of immense suffering and dislocation. Evidence from estate records, surveys, census returns and contemporary accounts is presented to establish the diversity of demographic and socio-economic characteristics in each county on the eve of the crop failures. The divergent nature and extent of capitalist relations illustrated by this data is crucial to explanations of the divergent consequences of the crop failures. Particular attention is given to evidence of changes in the structure of agricultural production and proto-industry as changes in these activities, post 1815, had important ramifications for the populations of Donegal and Argyll. The roots of the tragedy are found, not in local agricultural conditions or Malthusian pressures, but in changing structural circumstances which made proto-industrial production increasingly obsolete after the close of the Napoleonic Wars.

REDEVELOPMENT IN A COMPETITIVE GROWTH REGION by Robert A. Young, California State University, Fullerton, California 92634.

Driven by the desire to enhance their fiscal strength and regional image, many cities have pursued redevelopment as a growth-generating policy. This paper examines the longitudinal record of redevelopment among 115 adopter cities within the Greater Los Angeles region. Evidence since the early 1970s on long-term municipal debt, tax increments generated, and measures of retail and industrial growth, permit conclusions about the intensity of the redevelopment practice among cities and suburbs as well as its economic outcomes.

Classical redevelopment in the eastern United State was almost exclusively confined to distressed areas of large central cities. In California, the practice has been widely embraced by suburbs of all sizes and at all stages of their development histories. Redevelopment adoption diffused outward from the large established suburbs and industrial enclaves toward the metropolitan periphery, though not in any hierarchical fashion. Aggressive city borrowing for redevelopment does not automatically stimulate higher levels of private-sector investment. Redevelopment intensity has maintained, but not necessarily improved, cities' relative position in the regional hierarchy. Negative shadows and positive spillover effects between neighboring suburbs have been highly selective. The benefits of California-style redevelopment must be characterized as mixed and questionable in light of its frequently high cost.

THE NATURE OF SAN FRANCISCO: THE MULTIPLE MEANINGS OF GOLDEN GATE PARK by Terence Young, Department of Geography, University of California, Los Angeles, California 90024

Humanity lacks a clearly identifiable essence. As A.N. Whitehead once wrote, "Mankind is that factor in Nature which exhibits in its most intense form the plasticity of nature." From this viewpoint it is easy to understand the diverseness of social arrangements among human groups. This multitude of cultures accords well with natural diversity. At the same time, Nature is frequently posed as a counterpoint to Culture; with the multitude of cultures comes a multiplicity of natures.

A variety of views on Nature has long existed within the complex, pluralistic territory of the United States. I will argue that city parks are a direct expression of this diversity and best represent the heterogeneity of local attitudes toward the everyday roles of Nature in urban life. Municipal parks are symbolic places where the natural world is constructed to reflect widely held attitudes. Urban parks are artifacts formed largely of other species.

This paper will examine some of Nature's guises as expressed in San Francisco's Golden Gate Park at the time of its inception in the mid-Nineteenth Century. Of special interest will be its roles in "Christian Nurture," democratization, and the successful attraction of taxable wealth.

LAND RESOURCE MANAGEMENT IN LOESS PLATEAU, GANSU, CHINA - A PRELIMINARY MODEL OF AEAM APPROACH by Chang-Ching Yu, Department of Geography, University of Toronto, Toronto Ont. M5S 1A1 Canada

In this quantitative study, I have developed a computer simulation model on the environmental economy of Gansu Loess Plateau, China. The simulation results revealed that the pre-1980 policy of managing the human ecosystem, which is primarily grain-production oriented, has suffered from the increasing instability of the system. It is characterized by the prevailing soil erosion and, thus, a perennial dependency on the state's subsidies. The per capita grain yield is predicted around the current level in the year of 2000, i.e. 150 kg, if the pre-1980 policy continues. Nevertheless, with the same amount of the state's monetary investment but more adaptive policy according to the predicted benefit-cost ratios in the study, an optimistic scenario of the study indicates that the production will likely reach around 1000 kg by that time. The study has also assessed some alternative management policies through the model in terms of 20-year economic and ecological benefits and costs.

In addition, I have also explored qualitatively the issues of uncertainties, adaptive management, etc.. In those perspectives, the present model is only a preliminary exploration of some theoretical and methodological issues. It can be best used as a guideline for a much larger project involving using field survey and GIS techniques. Therefore, I conclude the paper by suggesting priorities and strategies to be employed to tackle many uncertainties and unknowns in the model.

A PRELIMINARY INVESTIGATION OF RECENT DESERTIFICATION ON THE SOUTHERN FRINGE OF THE TAKLAMAKAN DESERT by Pingnan Yuan, The Department of Geography, University of Toronto, Toronto, Ont. M5S 1A1.

The Taklamakan Desert in the north-west of China is commonly thought to be expanding over historic time, with its southern margin migrating southward. The paper studies the problem of desertification in the area in the period from 1918 to 1977, particularly in past 30 years or so since 1950.

The method used is primarily the comparison of 1977 landsat imagery with Stein's 1918 maps, supplemented by literature review. It is found that a general trend of southward encroachment of the desert in this area cannot be concluded. Rather, desertification has followed a complicated, patchy pattern. Net total area of farm land may have been increasing as a result of reclamation efforts, although more than half of the newly cultivated land has been lost due to desertification. The main reason for desertification over the study period appears to be human activities rather than climate changes.

However, examination of the historical record over many centuries yields an unclear picture of the relative contribution of these factors to desertification. The outlook for the future is not optimistic without the implementation of sustainable development policies.

AGE AND SEX STRUCTURE OF POPULATION IN EASTERN EUROPE by Kazimierz J. Zaniewski, University of Wisconsin-Oshkosh, Oshkosh, Wisconsin 54901

The poster presents the age and sex structure of population in eight countries of Eastern Europe during the 1970-87 period. The topic is analyzed, using graphs and maps, for the entire region, individual countries, and provinces. Factors affecting the age/sex composition are also examined. The highest degree of feminization characterizes East Germany and parts of Hungary and Yugoslavia, while the lowest sex ratios are found in Albania, Bulgaria, and parts of Romania. Age structure varies significantly among individual countries. High percentage of young population is found in Albania and southern Yugoslavia. On the other hand, large parts of East Germany, Hungary, and Bulgaria have a considerable percentage of older population. East Germany and Yugoslavia are characterized by the largest share of population in productive age. The factors strongly affecting the age structure are fertility and infant mortality; sex ratio is influenced by migration rates. While the sex ratios in Eastern Europe remained relatively constant during the examined period (except East Germany), all countries in the region have been affected by demographic maturity process, although the rate of change varied among and within these countries.

THE MAINE YANKEE REFERENDA: A DISTANCE-DECAY ANALYSIS OF OPPOSITION TO NUCLEAR POWER by Donald J. Zeigler, Old Dominion University, Norfolk, Virginia 23529--0088.

In 1980, 1982, and 1987 voters in the state of Maine were given the opportunity to decide whether the Maine Yankee nuclear power plant should continue to operate or be closed down. Only Maine has given voters an opportunity to close the state's only nuclear power facility on three separate occassions. That entrenched attitudes toward nuclear power seem to be difficult to change is demonstrated by the fact that all three referenda failed to close the plant. Yet, because some shift was documented in the aggregate figures, a town-by-town analysis of the vote for and against closing Maine Yankee provides a unique opportunity to identify the dynamics of changing public opinion, something which is difficult to do when data for only a single year is available. This paper will attempt to explain the changes which occured in the regional patterns, persistent and changing, of support for and opposition to the closing of Maine Yankee. The focus will be on the role of proximity to the Wiscasset plant and controversial potential nuclear dump sites. Findings will be interpreted in light of the role of direct democracy in the contemporary policy-making arena.

CHINA'S URBAN HOUSING: A STRUCTURATION PERSPECTIVE by J. Zhang, Department of Geography, University of Saskatchewan, Saskatoon, Canada, S7N 0W0

Geographers in the Western world have developed an institutional analysis for the study of allocation of housing in the past decade. This perspective uses structuration theory to support this allocation policy. Unfortunately, very few applications of this theoretical framework have been made within socialist societies. This paper attempts to address that void by examining the specifically Chinese interpretations needed to explain the problem of polarisation between 'choice' and 'constraints', thereby extending the discussion concerning structure-agency debate. Specifically, the paper applies structuration theory to urban housing reform within China. With a change from a centrally controlled allocation system to a quasi-market system, the central concern of housing reform in China is that policy has to reconstruct the residential structure in order to reduce housing inequalities in a fair manner. The recursive relationship between the state, collective and individual agents plays a key role in this reform.

A Quantitative Measure of White Spruce - Soil Texture Relations in the Drumheller Area A-xing Zhu

All White Spruce (*Picea glauca*) communities in the Drumheller area are located either on the north, northeast facing slopes of the tributaries or on the flood plain of the tributaries in the study area. A study was conducted to find out the major factors which contribute the existence of these spruce communities in the area.

Statistical relationships were observed between the growth of these spruce communities and the soil texture in B horizons of the soils on the slopes. The contribution of percentage of sand in B horizons to the growth of the spruce communities follows a second order polynomial model. So does the contribution of percentage of coarse silt in B horizons. This means that the growth of these spruce communities is optimal at certain percentages of sand and coarse silt. The growth decreases when the percentages of sand and coarse silt increase and decrease from these optimal points. These relationships state the optimal soil texture for the growth of the spruce communities on slopes in the area. In other words, the soil moisture and soil aeration condition for spruce growth are closely related to soil texture in soils on slopes. When the two spruce community sites on flood plains were added to the database, the above statistical relationships are no longer obvious. This implies that the soil moisture availability and aeration condition for spruce growth are not closely related to soil texture in soils on the flood plains as on the slopes.

COMMON FIELD AGRICULTURE IN THE CENTRAL ANDES: STRUGLES OVER PRODUCTION, SPACE, AND ECOLOGY IN THE 16TH AND 20TH CENTURIES by Karl S. Zimmerer, Department of Geography, University of North Carolina, Chapel Hill, North Carolina 27599.

This paper examines ecological and geographical change in the agriculture of Southern Peru's Colquepata region during two periods of transformation, the 16th and 20th centuries. Drawing from archival research, oral histories, and ethnographic participant observation, it focuses on the organization of individually cultivated parcels in common field, or sectoral fallowing, systems.

Common field agriculture was a site of struggle between Colquepata's indigenous inhabitants and Spanish rulers during the late 16th century. A crown survey (*visita*) of Colquepata in 1595 was designed to modify field layout. It repartitioned the scattered plots of separate sectors into single contiguous fields. The survey details local agriculture at the time and establishes the indigenous origin of highland sectoral fallow. Similarities between sectoral fallowing practices described in the *visita* and those still employed in the mid-20th century indicate that the Spaniards only briefly, if ever, reshaped the spatial organization of local agriculture. Roughly twenty years ago, however, the community of Colquepta abandoned common field management. Motivated by commercialization, and secondarily population growth, a group of agricultural households successfully pressured for the quitting of common field agriculture.

Opposition of indigenous cultivators to ethnic and economic domination was critical in amplifying differences between land-use change during each period under examination. Partly as a result, the agricultural and cultural ecology of regional agriculture—reflected in sectoral fallow systems and related environmental parameters—has undergone more change during the second half of the 20th century than the late 1500s.

COMPUTER-AIDED FINANCIAL ADVICE FOR WOMEN'S GROUPS IN INDONESIAN VILLAGES. John D. Nystuen, Urban Planning Program, The University of Michigan, Ann Arbor and Frank D. Zinn, Urban Planning Program, Michigan State University, East Lansing.

In a project undertaken for the National Family Planning Coordinating Board of Indonesia, the authors developed and installed a computer-aided management information system (MIS) at three test sites in West Java. The system provides financial advice to women's income generating groups. The women's groups are family planning acceptor clubs which have received interest free loans from the national family planning agency as part of its program to improve quality of life and to integrate concern for family planning into the fabric of village life. The women's groups, in turn, lend the money based on their own set of rules to individual members to be used in individual productive enterprises. Part of the earnings are then used to support family planning and mother/child health and nutrition activities in the village. If successfully managed, a group is able to pay back the family planning agency and to accumulate sufficient funds to continue self-sufficient operations. However, some groups fail through lack of good management practices. The MIS is designed to use monthly financial reports to evaluate performance indicators and to generate feedback letters that give suggestions for improving the self-management of the group.

The project is an example of the introduction of computer technology into provincial settings in the developing world.

BUSINESS ECONOMIC INDICATORS FOR EVALUATING THE REGIONAL STRUCTURE OF PRODUCTION by Harry Zondag, Department of Geography, Rijksuniversiteit Utrecht, P.O. Box 80.115, 3508TC, Utrecht, the Netherlands.

It is often premature to state only on the basis of employment figures or figures of industry that a regional economy is declining or improving. The question arises to what extent a picture of the economic development of a region will hold when business economic data, i.e. revenues, sales, returns and investments are used.

In this paper will be shown that a business economic indicator based on the above mentioned data gives a completive picture of the economic development of a region. The indicator is derived from the portfolio approach, but deviates in certain respects from earlier applications. The most important characteristic of this method is the use of disaggregated data extracted from business economic surveys of the chambers of commerce. Over a range of years data of individual firms are joined to periods of two years. These data sets of two yearly periods are on a regional level moulded into one dimension by way of a Mokken scale analysis for polychotomous items which can be interpreted as a measure of regional economic health. When these dimensions for a number of data sets are compared over a range of years, insight into a changing regional structure of production from a business economic point of view can be enhanced.

IDENTITY AND LANDSCAPE SYMBOLIZATION IN AUSTRALIAN CINEMA by Leo Zonn, Department of Geography and Planning, East Carolina University, Greenville, North Carolina 27858-4353.

The portrayal of Australia in the cinema of that country has been consciously preoccupied with a need and search for a national self-identity. Cinematic contributions to this identity have reflected a dynamic interaction between the federal government, public opinion, movie makers, and a complex set of real, mythical, and imposed attributes of the Australian psyche.

Focus of this presentation is upon the cinematic selection and emphasis of a set of distinguishing landscape symbols associated with the rural aspect of the nation's heritage. Specific elements of the physical environment and settlement type are complemented by human elements, such as the presence and interpretation of the land by aboriginals, and purported characteristics of the Australian personality, such as mateship, egalitarianism and anti-authoritarianism, to produce a unique and distinguishable set of landscape icons. Furthermore, the dynamics of this physical and human symbolization process are often cast in a historical context. These portrayals have simultaneously contributed to a successful cinema industry and national identity, but they may have also provided stereotypical and often unrepresentative images of the national character.

THE EFFECT OF CONTEXT ON GENDER WAGE GAPS by Jenny Zorn, California State University at San Bernardino, San Bernardino, California 92407.

Previous studies of the patterns of gender wage gaps set the groundwork for the presuppositions and expectations of this research. This study seeks to test for and reveal similar patterns, spatial variations, and the effect of differing environments on the relationships associated with gender wage gaps. This research design using the Expansion Method improves on the inadequacies in approaches that treat relationships as if context has no effect on them. The other approaches reveal only the beginnings of understanding the realties. Geographers are poised to enter these realities by examining relationships within their context.

In this study a model relating individual characteristics to income is assumed for a data set of nearly 800,000 cases from the U.S. census in 1980. The purpose of this study is investigating whether and to what extent this relationship holds with different parameter values across contexts or environments defined as the SMSAs in the U.S. The results allow the identification of specific wage expectations for a female with specific individual attributes in an SMSA with certain environmental characteristics. This is replicated for a male with identical characteristics and the gender wage gap is revealed.

USSR GIS DATA BASE by Craig ZumBrunnen, Department of Geography, University of Washington, Seattle, WA 98195.

This poster presentation displays maps, graphs and charts derived from the USSR GIS DATA BASE being developed at the Univeristy of Washington making use of *Excel* and *Oracle* software packages in both the MS-DOS and MacII environments and *Odessy* and *TransCAD* GIS packages. The preliminary attempts of the SEESIG's Committee on Computer Based Information Systems (CBIS) to develop a standardized encoding/referencing scheme are also graphically portrayed. Recent Soviet census population data (1989) are displayed by both nodal (city) and choroplet (regional population) maps. The Soviet electric power grid system is also mapped.

ADVENTURE TRAVEL: RIDING A NEW TOURISM WAVE by David N. Zurick, Eastern Kentucky University, Richmond, Kentucky 40475.

Adventure travel represents a rapidly-growing sector of the international tourism industry. It is supported by the increasing numbers of travelers from the west who seek ever-more exotic locations, activities, and cultural or natural history contacts. Despite the new-found importance of this segment of international tourism, we know very little about these tourists, their destinations, or their activities. This paper presents findings from a recent study of the adventure travel industry in the United States. It documents the growth of the adventure travel business in recent decades, it provides an analysis of the spatial patterns of adventure travelers from the United States who go to primarily Third World destinations, and it examines the nature of the interaction between the visitors and their host environments and cultures. The study finds that, whether it involves gorilla-watching in Rwanda or guerilla-watching in Nicaragua, trekking in Nepal or tracking in Kenya, adventure travel places tourists in some of the world's most fragile and tenuous cultural and ecological settings. It predicts that adventure travel contributes to a global travel pattern that bypasses the conventional tourist destinations, highlighting instead remote destinations that have very little tourism infrastructure.

COMPARATIVE ANALYSIS OF SMALL SCALE HILLSIDE FARMING IN THE DOMINICAN REPUBLIC by Mark O. Zweifler, Department of Geography, Michigan State University, East Lansing, Michigan, 48824, and Robert N. Thomas, Department of Geography, Michigan State University, East Lansing, Michigan, 48824.

The Dominican Republic has been plagued with the environmental degradation of its hillside agricultural areas. The literature assigns responsibility for this ecological crisis to the small scale farmer. We assume significant variation exists within the small hillside farming group based upon length of familial residence.

A key focus of this research is to disaggregate hillside farmers into two socioeconomic groups, descendants of early settlers and more recent arrivals. The study makes the assumption that long-term residents of these fragile areas are more likely to have developed sustainable systems, compatible to the environment, than their newly arrived neighbors.

Fieldwork for this investigation was conducted during fall 1989. To test the posed assumptions, a questionnaire was administered to a representative sample of small scale hillside farmers. Furthermore, knowledgeable informants provided additional information regarding sustainable agricultural research in the study area.

Currently, there are numerous sustainable hillside farming projects employing imported agricultural models. This research will identify and evaluate the utility of indigenous, traditional systems for broader application in the Dominican Republic.

* * *

Geography from Routledge

Second Edition

A Modern Dictionary of Geography

John Small and Michael Witherick

"... a handy, useful, lean volume of about two thousand carefully selected terms with clear definitions and adequate explanations, enhanced by 124 black-and-white illustrations of clarity and relevance."

—*American Reference Books Annual*

Edward Arnold	240 pp	$45.00/cloth
Canada [NCR]		$17.95/paper

Forthcoming

Natural Environment: Problems and Management Series

Green Development

Environment and Sustainability in the Third World

Bill Adams

Adams demonstrates that the "greenness" of development planning is not to be found in a concern for the environment, but in control, power and self-determination.

256 pp	$47.50/cloth
Canada	$57.00/cloth

Development and Underdevelopment Series

Latin American Theories of Development and Underdevelopment

Cristóbal Kay

The first systematic and comprehensive analysis of the Latin American school of development.

304 pp	$15.95/paper	$65.00/cloth
Canada	$19.00/paper	$59.95/cloth

Routledge Introductions to Development

Rural Development in the Third World

Chris Dixon

A general introduction to the approaches, policies, and problems associated with Third World rural development, illustrated with up-to-date case studies on development trends and their benefits to the poor and the national economy.

144 pp	$11.95/paper
Canada	$14.95/paper

A Modern Dictionary of Geography
John Small and Michael Witherick

RAIN
RHETORIC AND REALITY

Acid Rain

Rhetoric and reality

Chris Park

"Park is obviously familiar with the area and has rehearsed it well. A welcome addition to the acid-rain debate that is highly recommended for general audiences ..." — *Choice*

272 pp, illustrated	$25.00/paper
Canada	$30.00/paper

Sports Geography

J. Bale

Written in a lively, stimulating, and provocative style, and illustrated by photographs and case studies, this is the first book to present an overview of the emerging sub-discipline of sports geography, demonstrating the fascinating insights which geography can bring to bear on sports in a variety of contexts.

E. & F. N. Spon	262 pp, illustrations	$22.50/paper
Canada		$27.00/paper

Forthcoming

Global Environmental Issues

A Climatological Approach

David D. Kemp

A multidisciplinary and nontechnical study of major environmental problems including the greenhouse effect, ozone depletion, acid rain, nuclear winter and drought.

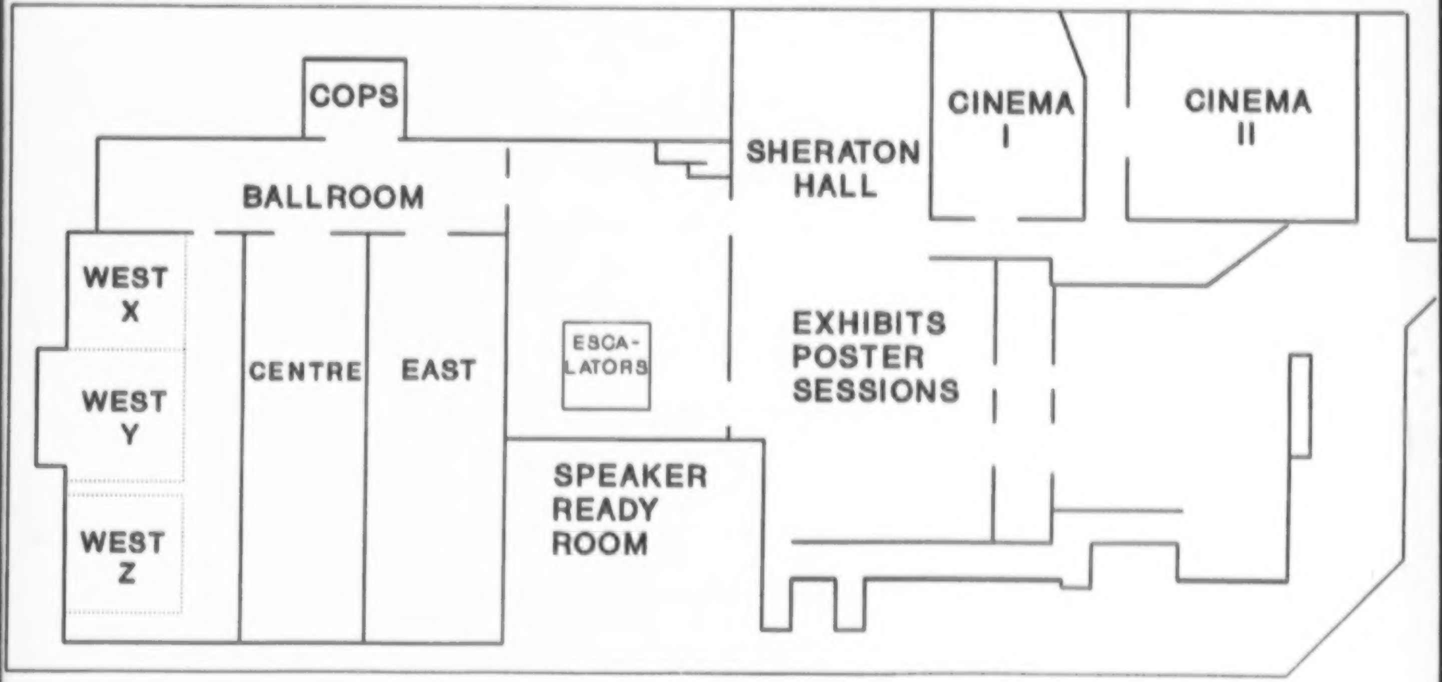
176 pp, illustrations	$14.95/paper	$52.50/cloth
Canada	$17.95/paper	$63.00/cloth

On display at booth #209

Routledge
An imprint of Routledge, Chapman and Hall, Inc.

29 West 35th Street
New York, New York 10001-2291

LOWER CONCOURSE


COPS
BALLROOM
WEST X
WEST Y
WEST Z
CENTRE
EAST
ESCA-LATORS
SPEAKER READY ROOM
SHERATON HALL
CINEMA I
CINEMA II
EXHIBITS POSTER SESSIONS

NEW AND BESTSELLING GEOGRAPHY BOOKS FROM

ROWMAN & LITTLEFIELD
BARNES & NOBLE BOOKS

ATOP THE URBAN HIERARCHY

Edited by *Robert A. Beauregard*

Taking a political-economic approach from strands of urban geography and planning, the authors provide an in-depth study of five cities—New York, Chicago, Philadelphia, Houston, and Los Angeles—and examine the connections between structural transformations in the postwar economy and their parallel development.

1989 304 pp.
ISBN 0-8476-7554-8 $36.50 Cloth

COMMUNITY ANALYSIS AND PLANNING TECHNIQUES

Richard E. Klosterman

Introduces and describes four techniques that are at the core of professional practice and education: curve-fitting extrapolation, cohort-component, economic base, and shift-share technique.

February 1990 272 pp.
ISBN 0-8476-3951-7 $37.50 Cloth
ISBN 0-8476-7651-X $16.95 Paper

NEW TITLES

GEOGRAPHY OF SOILS
Formation, Distribution and Management

Second Edition

Donald Steila and *Thomas E. Pond*

This book examines the important role that soil has as one of man's primary resources. The new edition provides a more thorough discussion of clay mineral structures and soilscapes and suborders within a regional context.

1989 249 pp.
ISBN 0-8476-7592-0 $34.50 Cloth

IMAGES OF THE WEST
Third World Perspectives

David C. Gordon

"Gordon brings it all together, sorts out the key issues and adds some carefully couched views of his own. Loaded with references and statements of other scholars, the book will have particular appeal to an academic audience."—*Foreign Affairs*

1989 232 pp.
ISBN 0-8476-7603-X $32.50 Cloth

THE SOVIET UNION
A Systematic Geography

Second Edition

Edited by *Leslie Symons*

A completely revised and updated edition of this best selling text.

"Provides an up-to-date account of the basic aspects of the physical, economic, and human geography of the USSR, introducing a number of topics not generally covered in geography textbooks."—*Journal of Geography*

1990 ca 300 pp.
ISBN 0-389-20917-1 $29.50 Paper

WATER RESOURCES PLANNING

Andrew A. Dzurik

A comprehensive text surveying all aspects of water resources planning and management, including the principles of hydrology, legal issues, government policies, economic analyses, and future trends in the field.

March 1990 306 pp.
ISBN 0-8476-7391-X $39.50 Cloth

GEOGRAPHY: HISTORY AND CONCEPTS
A Student's Guide

Second Edition

Arild Holt-Jensen

"Not only students but older geographers will profit from reading a work of such clarity and good sense."—*Scottish Geographical Magazine*

1988 ISBN 0-389-20807-8 $24.50 Paper

Stop By
Booth #214

BEST SELLERS

NORTH AMERICA
The Historical Geography of a Changing Continent

Edited by *Robert D. Mitchell* and *Paul A. Groves*

". . . this book succeeds both as a text and a secondary source. The book is the concerted effort of 17 scholars who are well known in historical geography and have contributed original essays. It should be in every academic library."—*Choice*

1987 480 pp.
ISBN 0-8476-7347-2 $54.50 Cloth
ISBN 0-8476-7549-1 $29.75 Paper

REFUGEES AS IMMIGRANTS
Cambodians, Laotians, and Vietnamese in America

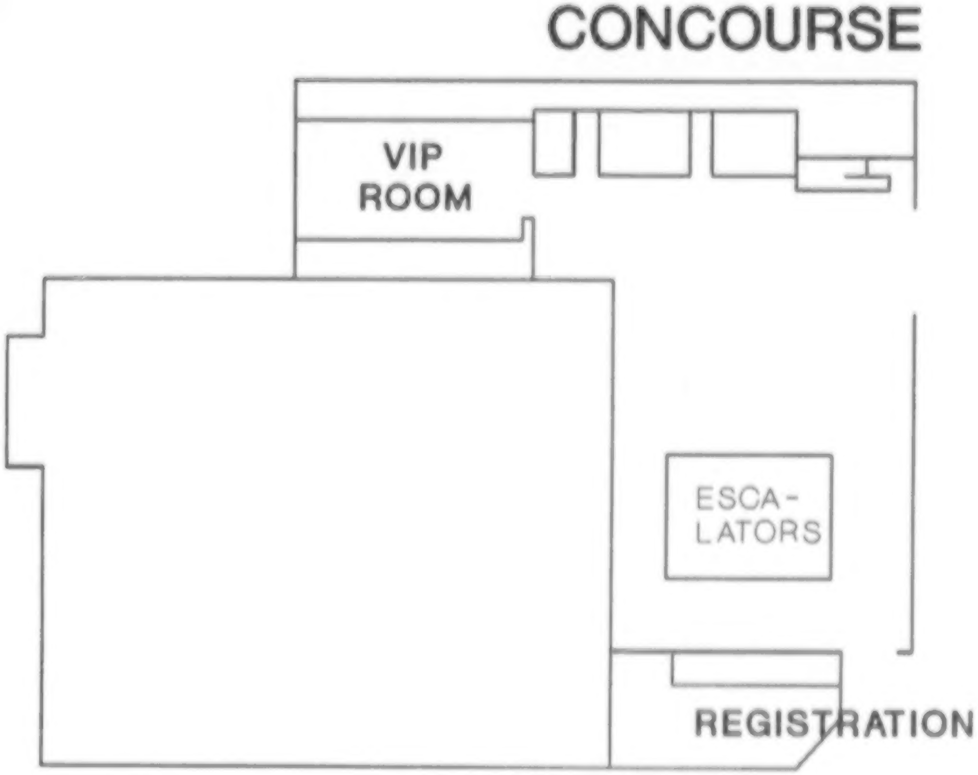
Edited by *David W. Haines*

A clear concise survey of the first decade of Southeast Asian refugee settlement in the United States. Examines the cultural and social diversity within the refugee population, and the variations in the specific conditions refugees face in particular American localities.

1988 256 pp.
ISBN 0-8476-7553-X $35.00 Cloth

ROWMAN & LITTLEFIELD PUBLISHERS, INC.

8705 BOLLMAN PLACE • SAVAGE, MARYLAND 20763 • (301) 306-0400


CONCOURSE
VIP ROOM
ESCA-LATORS
REGISTRATION

Unwin Hyman

formerly Allen & Unwin

The Making of the American Landscape
Edited by Michael P. Conzen
1990 256pp. line & b/w photos
Cloth $55.00 Paper $19.95

Now available in paperback
London 2001
Peter Hall
1990 256pp. illus.
Cloth $34.95 Paper $17.95

Now available in paperback
Cost-Benefit Analysis in Urban and Regional Planning
John A. Schofield
1990 256pp.
Cloth $39.95 Paper $24.95

Place, Policy and Politics
Do Localities Matter?
Edited by John Urry, Michael Harloe and Chris Pickvance
June 1990 256pp. illus.
Cloth $55.00 Paper $19.95
Changing Urban and Regional System of Britain

Shared Space: Divided Space
Essays on Conflict and Territorial Organization
Edited by Michael Chisholm and David M. Smith
May 1990 288pp. illus.
Cloth $55.00 Paper $24.95

Back to the Future
Modernity, Postmodernity and Locality
Philip Cooke
1990 192pp. Cloth $39.95

Growth Policy in the Age of High Technology
The Roles of Regions and States
Edited by Jurgen Schmandt and Robert Wilson
1990 288pp. Cloth $49.95

Neptune's Domain
A Political Geography of the Sea
Martin Ira Glassner
May 1990 160pp. illus.
Cloth $34.95

Maps of Meaning
An Introduction to Cultural Geography
Peter Jackson
1989 192pp.
Cloth $60.00 Paper $17.95
Contours

Deindustrialization and Regional Economic Transformation
The Experience of the United States
Edited by Lloyd Rodwin and Hidehiko Sazanami
1990 288pp. illus.
Cloth $70.00 Paper $27.95

Remaking Human Geography
Edited by Audrey Kobayashi and Suzanne Mackenzie
1989 288pp. illus.
Cloth $55.00 Paper $21.95

America's Suburban Centers
Robert Cervero
1989 256pp. Cloth $49.95

New Models in Geography
The Political-Economy Perspective
Volumes 1 and 2
Edited by Richard Peet and Nigel Thrift
1989 448pp. each
Volume 1 Cloth $75.00 Paper $29.95
Volume 2 Cloth $75.00 Paper $29.95

Collapsing Space and Time
Geographic Aspects of Communications and Information
S. Brunn and T. Leinbach
1990 384pp.
Cloth $70.00 Paper $24.95

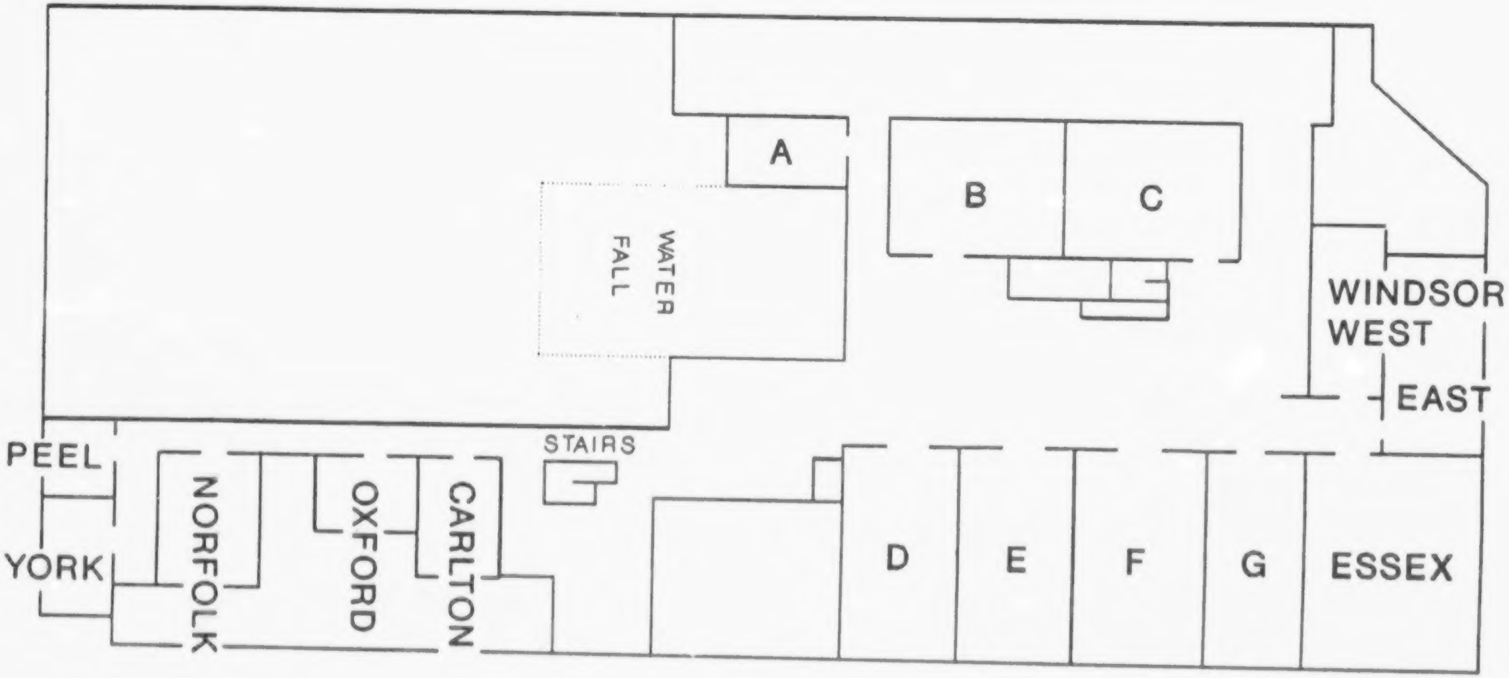
Localities
The Changing Face of Urban Britain
Edited by Philip Cooke
1989 320pp. Cloth $60.00 Paper $24.95

The Global Economic System
Ian Wallace
1990 256pp.
Cloth $49.95 Paper $17.95

Please visit us at Booth 109.

UNWIN HYMAN
8 Winchester Place, Winchester, MA 01890
MasterCard and Visa customers CALL TOLL FREE 1-800-547-8889
In Massachusetts and Canada CALL 1-617-729-0830

MEZZANINE


A
B
C
WATER FALL
WINDSOR
WEST
EAST
STAIRS
PEEL
YORK
NORFOLK
OXFORD
CARLTON
D
E
F
G
ESSEX

West Publishing and geography. Bringing our experience to another subject.

West Publishing Company. We're a fresh new face in the geography textbook market. But our company has actually been publishing texts for over 100 years. Our longevity is the result of quality texts and first rate service.

Now we've expanded our line of texts to the geography field. And we are committed to bringing you the quality and service that has made us successful in so many other fields.

Proof of our committtment is *Physical Geography* by Ralph Scott. In its first year this book became a leading text in the physical geography field.

Our new geography texts, listed below, will be displayed at the AAG convention. Please stop by our booth and take a look.

World Regional Geography (1990)
Robert E. Norris

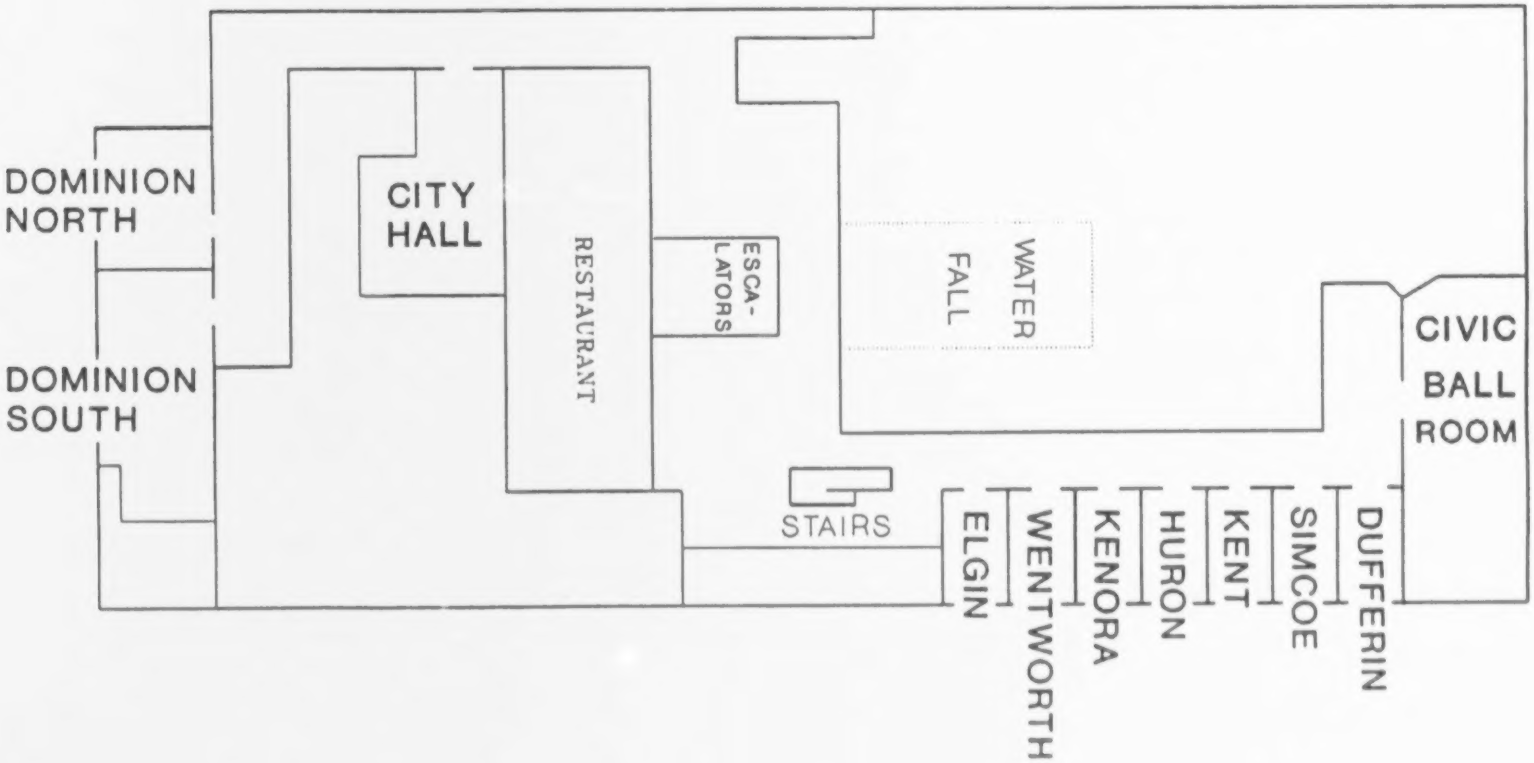
Cultural Geography: People, Places and Environment (1990)
Richard H. Jackson & Lloyd E. Hudman

Physical Geography (1989)
Ralph Scott

Human Geography (1987)
C. Murray Austin, Rex Honey, &
Thomas C. Eagle

West Publishing Company
College and School Division
50 W. Kellogg Blvd.
St. Paul, MN 55164-1003

SECOND FLOOR


DOMINION NORTH
DOMINION SOUTH
CITY HALL
RESTAURANT
ESCA-LATORS
WATER FALL
STAIRS
CIVIC BALL ROOM
ELGIN
WENTWORTH
KENORA
HURON
KENT
SIMCOE
DUFFERIN

NOTES

From Texas

BEDOUIN LIFE IN THE EGYPTIAN WILDERNESS
By Joseph J. Hobbs
Foreword by Leo Tregenza

The first modern ethnographic portrait of the Maʿaza Bedouins. Focusing on the relation of the Maʿaza to their land, this study includes a wealth of ethnographic detail about Bedouin beliefs, values, and lifeways.
$25.00 cloth

CANAL IRRIGATION IN PREHISTORIC MEXICO
The Sequence of Technological Change
By William E. Doolittle

A synthesis of all archaeological work done to date on irrigation canals in Mexico. By reconstructing the history of canal irrigation technology and its development from 1500 B.C. to A.D. 1500, William Doolittle debunks many myths about ancient irrigation.
$30.00 cloth

The Geographic Society of Chicago publication award,
1988 Book-of-the-Month Club and History Book Club main selections

MAN ON EARTH
By John Reader

Reader explores the impressive record of adaptability of twelve widely disparate societies and reaffirms the value of human diversity in an age of unprecedented change and challenge.
$29.95 cloth

RETURN OF THE WHOOPING CRANE
By Robin W. Doughty

From an all-time low of twenty-one wild birds in 1944, the whooping crane has rebounded from near-extinction. In this first study since the 1960s that draws together all current knowledge about whooping crane biology and conservation, Robin Doughty charts this impressive recovery, documenting the efforts of scientists to save these magnificent birds.
$24.95 cloth

WHERE NORTH MEETS SOUTH
Cities, Space, and Politics on the United States–Mexico Border
By Lawrence A. Herzog

Since 1950, the nearly two thousand mile long frontier zone between the United States and Mexico has become the most heavily populated border region in the world. Lawrence Herzog examines the theoretical and political implications of boundary urbanization at the points of territorial overlap between Latin American and North American cultures.
$24.95 cloth $12.95 paper
Distributed for the Center for Mexican American Studies
and the Institute of Latin American Studies

See these and other books at booth 207 at the annual meeting.

University of Texas Press
BOX 7819 AUSTIN, TEXAS 78713 1(800)252-3206

NOTES

Geography from Yale

Out of Place

Restoring Identity to the Regional Landscape

Michael Hough 174 illus. $35.00

BORDERLAND
ORIGINS OF THE AMERICAN SUBURB 1820-1939
JOHN R. STILGOE

Borderland

Origins of the American Suburb, 1820-1939

John R. Stilgoe 198 illus. $35.00

The Developer's Frontier

The Making of the Western New York Landscape

William Wyckoff 76 illus. $27.50

The Craft of Gardens

Ji Cheng; translated by Alison Hardie, with an introduction by Maggie Keswick 50 b/w + 40 color illus. $35.00

Environmentalism and the Future of Progressive Politics

Robert C. Paehlke $25.00

The Edwardian Garden

David Ottewill 180 b/w + 125 color illus. $50.00

The Land That Became Israel

Studies in Historical Geography

edited by Ruth Kark; translated by Michael Gordon 55 illus. $27.50

Space and Spirit in Modern Japan

Text and photographs by Barrie B. Greenbie 308 illus. $29.95

Loudon and the Landscape

From Country Seat to Metropolis, 1783-1843

Melanie Louise Simo *Winner of the Boston Society of Landscape Architects' honor award for research* 133 b/w + 10 color illus. $45.00

Air Pollution's Toll on Forests and Crops

edited by James J. MacKenzie and Mohamed T. El-Ashry 96 line figs. $38.50

A World Resources Institute Book

Yale University Press and The Historical Geography Specialty Group are proud to announce a new series

The Historical Geography of Social Change

edited by **Carville Earle**, *Chairman, Department of Geography and Anthropology, LSU*

The inaugural volume by **G. William Skinner** *is scheduled to appear in the spring of 1991. Future authors in the series will include* **Janet Abu-Lughod** *and* **Immanuel Wallerstein**.

New Paperbounds

The Shaping of America

A Geographical Perspective on 500 Years of History
Volume I: Atlantic America, 1492-1800

D.W. Meinig

"Simply the best book in the English language by a contemporary geographer I have read over the past forty-odd years, and one of the most important....A magisterial achievement."—Wilbur Zelinsky, *Journal of Geography* Illus. $19.95

The City as a Work of Art

London, Paris, Vienna

Donald J. Olsen 142 b/w + 8 color illus. $19.95

The Desert Is No Lady

Southwestern Landscapes in Women's Writing and Art

edited by Vera Norwood and Janice Monk 74 illus. $19.95

Ecology in the 20th Century

A History

Anna Bramwell *New in cloth* ($40.00) *and paper* ($16.95)

See these and other new books at Booth 115.

Yale University Press
92A Yale Station
New Haven, CT 06520

NOTES

Erdas™

DESKTOP MAPPING SYSTEM

THE LOW-COST SOLUTION

ERDAS is pleased to announce the Desktop Mapping System (DMS). For under $2,000.00, you can have full-featured image processing and digital mapping on your PC or IBM PS/2. DMS is perfect for educational, production, and research environments. Analyze images, overlay vectors, and exchange data with other GIS systems including pcARC/INFO, ERDAS, and AutoCAD.

Three DMS Modules are available:

DMS-EDUCATOR

$1,985*

- Image Processing
- Planimetric Mapping
- Screen digitizing
- Teaching materials and data sets

DMS-STEREOGRAPHIC

$3,900*

- Orthoimage production
- Interactive contouring
- Automated stereocorrelation for DEMs
- Wireframe terrain generation with image overlay
- Prerequisite DMS-Professional

DMS-PROFESSIONAL

$4,750*

- Image Processing
- Planimetric Mapping
- Tablet and screen digitizing
- Large file handling

HARDWARE SUPPORTED

- PC (80286 and 80386)
- IBM PS/2 (Models 50 and higher)
- Utilizes off-the-shelf graphics displays
- Contact ERDAS for specific system configurations

*Introductory prices. Quantity and Educational Discounts available.

ERDAS, Inc.

2801 Buford Highway, Suite 300, Atlanta, Georgia 30329/(404) 248-9000 Telex: 706327 Fax: (404) 248-9400

Representation in Europe, Asia, Pacific Basin, Australia, Indian Subcontinent, Africa, South America, Middle East

Erdas™

2801 Buford Highway, Suite 300, Atlanta, Georgia 30329. **Visit Booth #204**

Yes. Please send more information on DMS.

Name __________

Address __________

City __________ **State** __________ **Zip** __________

Telephone __________

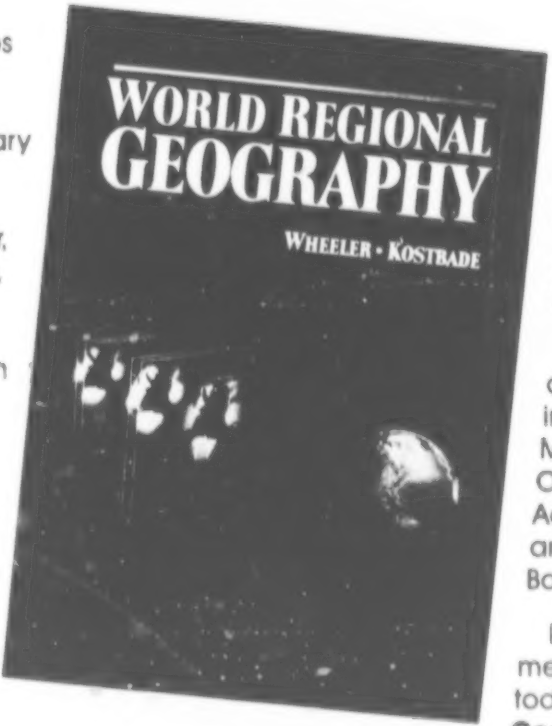
Desktop Mapping System, DMS, DMS-Professional, DMS-Educator, and DMS-Stereographic are trademarks of R-WEL, Inc.
Trademarks of other companies are used for reference only. © 1989 ERDAS, INC. ALL RIGHTS RESERVED.

The world as your students should know it

Discover how **World Regional Geography** helps your students grasp the human and physical dimensions of contemporary geography.

Authors Jesse H. Wheeler, Jr. and J. Trenton Kostbade, of University of Missouri—Columbia, combine a mastery of geography with classroom experience that's thousands of students strong.

Illustrated with over 300 full-color maps, **World Regional Geography** offers a unique combination of scholarship, readability and analysis. The photography presents a panoramic portrayal of landscape features, cultures, economic activities and geographic concepts.



WORLD REGIONAL GEOGRAPHY

WHEELER • KOSTBADE

For the student—a free 'Map-Pak' is shrink-wrapped with each text. This collection of unlabeled maps can be used in class or as an independent study aid.

For the instructor—a full complement of ancillaries including an Instructor's Manual, Study Guide, Overhead Transparency Acetates, Slide Set, Test Bank and a Computerized Test Bank for IBM or MacIntosh.

Request your complimentary examination copy today of **World Regional Geography** and show your students the world as they should know it.

ISBN 0-03-032653-2 1989

AVAILABLE NOW!

SAUNDERS
COLLEGE PUBLISHING

STOP BY BOOTH #216

The Curtis Center Independence Square West Philadelphia, PA 19106

MW28 AAG 4-90

PUTTING GEOGRAPHY ON THE MAP

New & Recent Titles from Wiley

WORLD REGIONAL GEOGRAPHY, Third Edition
Richard H. Jackson, *Brigham Young University*
Lloyd E. Hudman, *Brigham Young University*
0-471-50633-8 ◆ 578pp (cloth) ◆ 1990
Instructor's Manual

WORLD REGIONAL GEOGRAPHY:
A Question of Place, Third Edition
Paul Ward English, *University of Texas at Austin*
0-471-61648-6 ◆ 620pp (cloth) ◆ 1989
Instructor's Manual

GEOGRAPHY: Regions and Concepts,
Fifth Edition
Harm J. deBlij, *National Geographic Society and University of Miami*
Peter O. Muller, *University of Miami*
0-471-85358-5 ◆ 688pp (cloth) ◆ 1988
Instructor's Manual, Study Guide, Film Roll

MAP II MAP PROCESSOR
A Geographic Information System for the Macintosh
Micha Pazner, *University of Manitoba*
K. Chris Kirby, *University of Manitoba*
Nancy Thies
0-471-50531-5 (complete set) ◆ 1989
1 Program Disk, 1 Data Disk, Reference Manual (200 pages), Tutorial Manual (200 pages)

EUROPE IN THE 1990'S:
A Geographical Analysis
George W. Hoffman, *Editor*
University of Texas–Austin
0-471-62280-X ◆ 650pp (cloth) ◆ 1990

SYSTEMATIC POLITICAL GEOGRAPHY,
Fourth Edition
Martin I. Glassner, *Southern Connecticut State University*
Harm J. deBlij, *National Geographic Society and University of Miami*
0-471-63583-9 ◆ 540pp (cloth) ◆ 1989

INVESTIGATING PHYSICAL GEOGRAPHY
Arthur N. Strahler
Alan H. Strahler, *Boston University*
A Laboratory Manual cross-referenced with both Strahler texts (see below)
0-471-51011-4 ◆ 350pp (paper) ◆ 1989

ELEMENTS OF PHYSICAL GEOGRAPHY,
Fourth Edition
Arthur N. Strahler
Alan H. Strahler, *Boston University*
0-471-61647-8 ◆ 450pp (cloth) ◆ 1989
Instructor's Manual, Student Study Guide, Transparency Masters, Workbook and Lab Manual

MODERN PHYSICAL GEOGRAPHY, Third Edition
Arthur N. Strahler
Alan H. Strahler, *Boston University*
0-471-85064-0 ◆ 500pp (cloth) ◆ 1988
Instructor's Manual, Study Guide, Film Roll, Transparencies

ORDER YOUR COMPLIMENTARY COPY TODAY...
Write on your school letterhead to: Jean Moorehead, Dept. 0-0341, John Wiley & Sons, Inc., 605 Third Avenue, New York, NY 10158. Be sure to include the name of your course, its enrollment, and the name of your current text.
IN CANADA: John Wiley & Sons Canada Ltd., 22 Worcester Road, Rexdale, Ontario, M9W 1L1

PLEASE STOP BY OUR BOOTHS... # 210 & 111.

WILEY